IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication DECEMBER 15, 1960

George Kufrin

★ Consultant J. A. Patton Explains—

How to Make Job Evaluation Work p. 75

The Swing to Bright Annealing p. 78

Impact of New Technology p. 105

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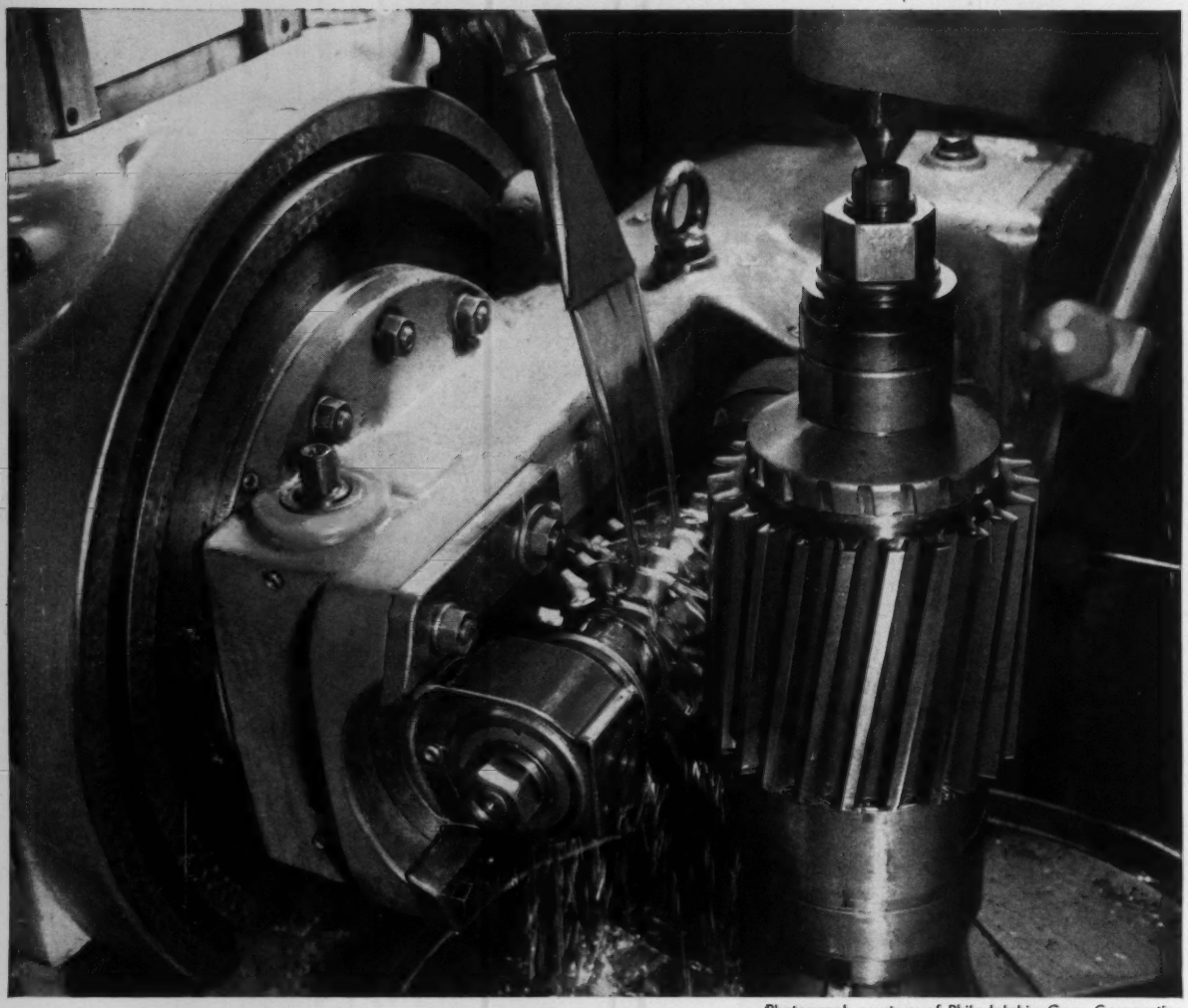

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December 15, 1960—Vol. 186, No. 24

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BRIGHT ANNEALED

Stainless Trend—Probably as the result of demands of the auto industry, most stainless steel producers

are swinging to bright annealing. There's some dissent, but it could mean new markets. P. 78

NEW FEDERAL AGENCIES

Some Additions Likely—A bevy of new Federal regulatory agencies will probably be proposed by the Kennedy Administration. Some likely prospects: Transportation, urban affairs, and economic aid. P. 79

OPERATING RATE

On the Way Out?—For years, the accepted way to gage steelmaking operations was as a per cent of capacity. Now, many in the industry want to do away with the old operating rate. P. 80

ARMCO TRADEMARK

Gets New Look — Armco Steel

Metalworking

Cover Feature

JOB EVALUATION—Many good job evaluation programs fail because of lack of management attention. In this week's Special Report, consultant J. A. Patton explains some of the how's and why's of making a program pay off. P. 75

Corp. has modernized its 46-year-old trademark. New design symbolizes growth, Armco says, and follows trend to greater corporate identity. P. 81

CASTINGS

Imports Hurt Sales—Gray iron foundry executives say imports and air pollution problems are causing worries. There are some who think 1961 will be a good year. However, most look for profit shrink. P. 83

Engineering-Production Developments

CHANGING TECHNOLOGY

Spawns New Patterns — Technological change is often called the most powerful force in shaping our future growth. It causes the birth of new products and creates whole new industries. But it spawns many new problems. Each technological goal has its own set of challenging problems and patterns. P. 105

VERSATILE TOOL STEEL

Features Long Life—A new tool steel outperforms more costly high-speed steels. It's expected to eliminate the need for many of the 20-odd special-purpose grades now in use. The newcomer can be heat treated to Rc 69. Its use permits higher speeds and feeds. P. 108

WELD COLUMBIUM ALLOYS

Without Contamination—Despite growing acceptance, columbium and its alloys present tough welding problems. Vacuum-purged chambers and argon atmospheres preclude contamination with oxygen, nitrogen, carbon and hydrogen. Check the scoreboard for results. P. 110

PLASTIC CHUCKS

Speed Tube Turning — Step chucks, made from laminated plastic, reduce machining time on soft materials. The free-machining plastic also pares chuck-inventory needs. Pressure on the tubing is distributed over a wide, evenly-held area. P. 113

FUTURE HOLDS CHANGES

For Iron-Ore Industry — The future of the iron-ore industry will affect our nation's economy. A study on world-ore reserves, growing consumption, and imports points up interesting trends. P. 114

Market and Price Trends

ALUMINUM PIPE

Ready to Go — Producers of aluminum pipe believe that it will really start to move in 1961. They expect sales to double, now that users know about it. P. 82

AUTOMOTIVE

Accent on Youth—Automakers are preparing to tackle the '60's with vigor. A number of executive appointments in recent weeks nearly all emphasize youth. P. 91

WEST COAST

Jobs Affected—When the Pentagon changes its thinking about defense methods, it can affect Farwest employment. Missiles, for example, need less people in production than manned aircraft. P. 93

STEEL SUMMARY

Slight Pickup Continues — The small upturn in steel orders is encouraging. But sales officials are trying to decide if it's the start of a real pickup. P. 133

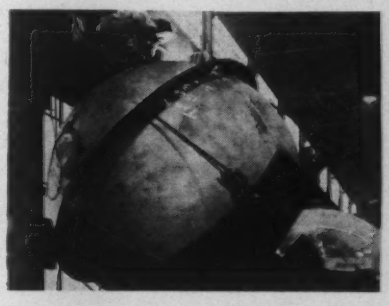
PURCHASING

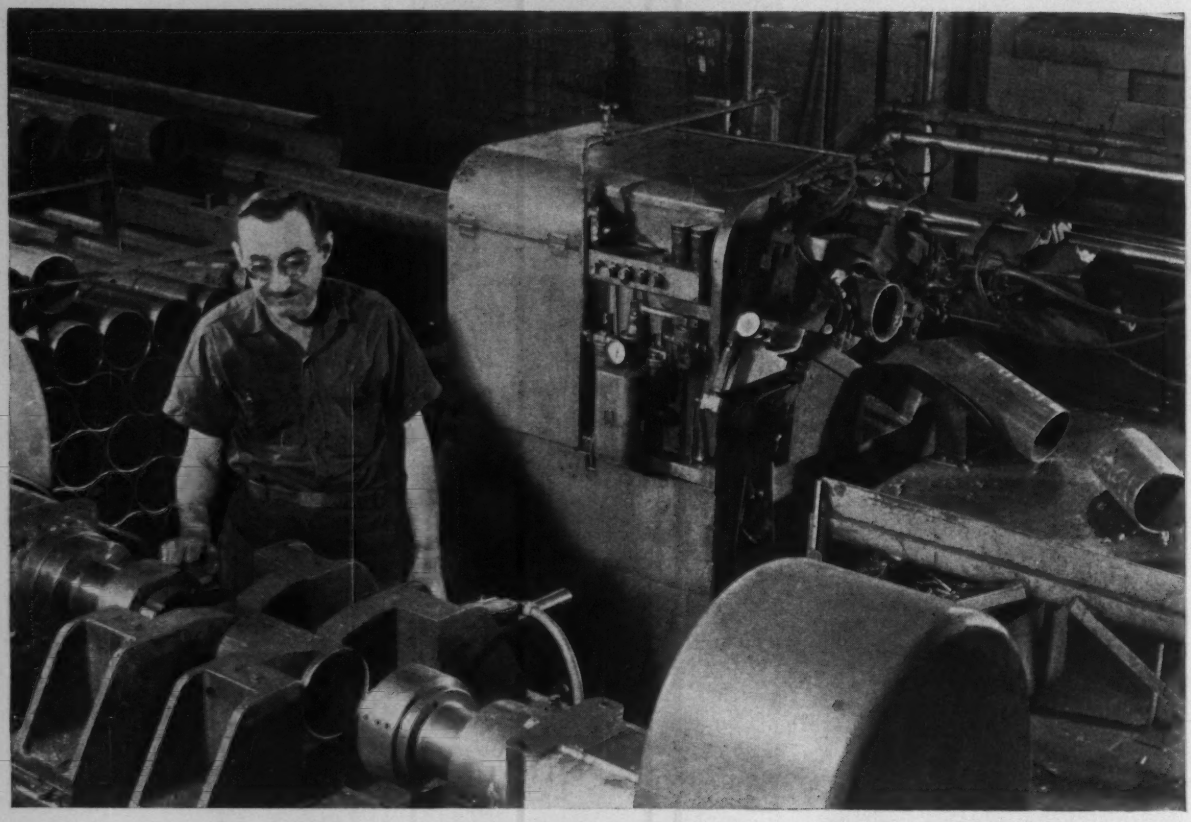
Electric Motors—The producers of electric motors say prices are still soft despite increased labor costs. They look for an increase in business next year. Currently, activity is slow but deliveries are normally rushed. P. 134

NEXT WEEK

CAPITAL GOODS OUTLOOK

First Half Trends — Next week The IRON AGE will report capital goods spending plans by some 39 metalworking industries. Appropriations data will indicate capital spending trends through first-half 1961.





Tubing for this job must meet the most rigid specs

This manufacturer of heavy-duty idler rollers has turned to increased automation and tighter material specs to improve production. Note automatic feed and cutoff of tubing in background . . . the quick setup for double-end counterboring at the next station.

Tubing for this job must meet highest standards for uniformity of size, straightness and close tolerance of concentricity. But where do you find large O.D. tubing to meet these rigid specs? At Ryerson, of course—home of the industry's tightest quality controls.

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Communications Crisis: It's Worse Than You Think

Every day thousands of company officials send out the "word" to their employees. It is supposed to trickle down to the man at the machine, on the end of the pencil, or in the seat of middle management. That's what you think!

Learned pieces on the importance of being heard are read, delivered, and often ignored. More pieces are sent along to thousands telling what free enterprise is, what management's viewpoint is, and what ought to be done about it.

Company after company spends up in the five —and sometimes six—figures to drive home a point to their workers or their supervisors. They think they have done a good job.

But the payoff is that a good job has not been done. Many executives haven't the slightest idea what the "other fellow" understands.

Most listeners "get" about 25 pct of any message; this despite the fact that seven out of ten minutes of our waking lives are spent communicating, or trying to. Dr. Paul Rankin of Ohio State University says communication is allocated as follows: 9 pct to writing; 16 pct to reading; 30 pct to speaking; and 45 pct to listening.

Another study shows that workers understand less than 25 pct of what their managers think they understand. How about that?

Now if you don't want to take the word of professors who have spent years on this subject —as has Ralph G. Nichols of the University of Minnesota—look to an outside study.

Erle Savage of the advertising and communications firm of Savage-Lewis Corp., Minneapolis, enlightened Professor Nichols. What he told him suggests you might spend more time worrying about where your policies, orders, suggestions, and pet theories end up.

When the president or board of directors gives the "word," what happens? Here goes: the V.P.'s understand about 67 pct of it; general supervisors get 56 pct of it; 40 pct reaches the plant manager. The foreman understands 30 pct, and, guess what? The worker gets 20 pct.

In a recent study, management ranked "appreciation of work done" in eighth position. In ninth was "feeling 'in' on things" and, tenth, "sympathetic help on personal problems." Workers ranked them this way: First, "appreciation of work done"; second, "feeling 'in' on things"; third, "help on personal problem." Management knew so little about workers' viewpoints that it missed out 100 pct.

Page Professor Nichols!

Tom Campbell

Editor-in-Chief

CHAINS FOR EVERY SERVICE

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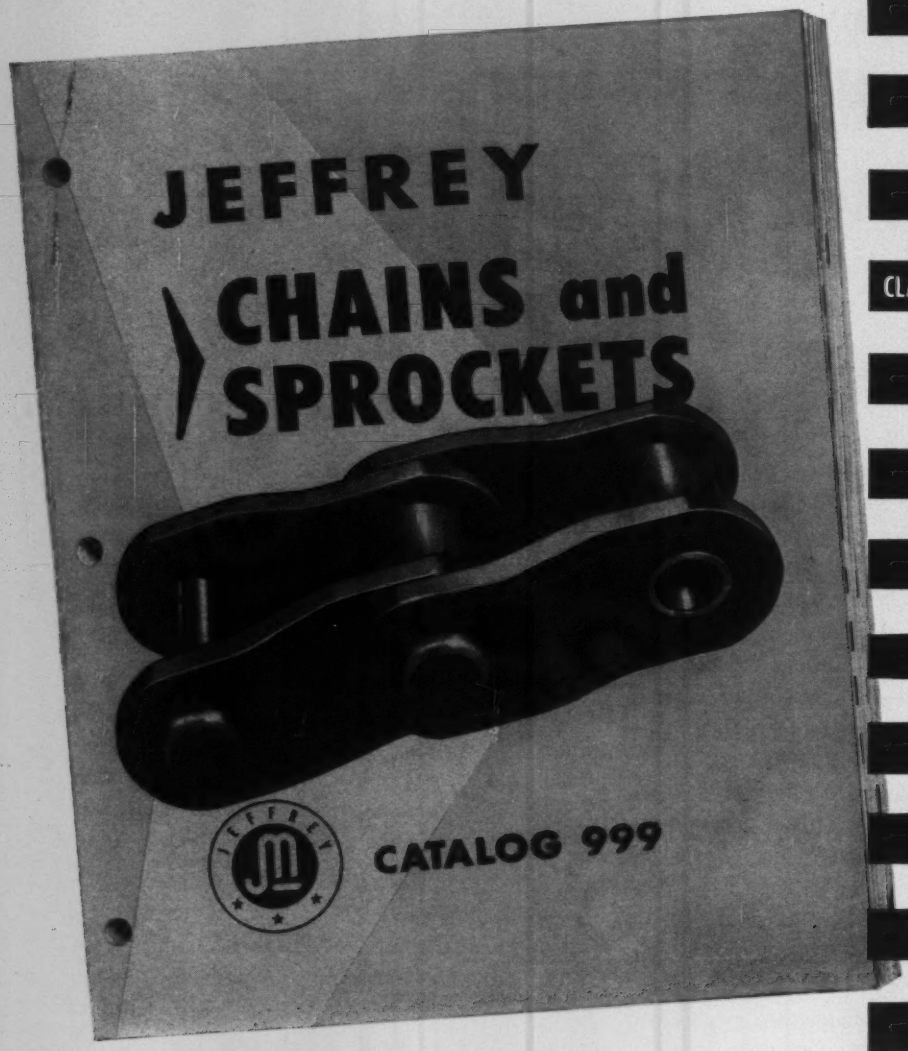

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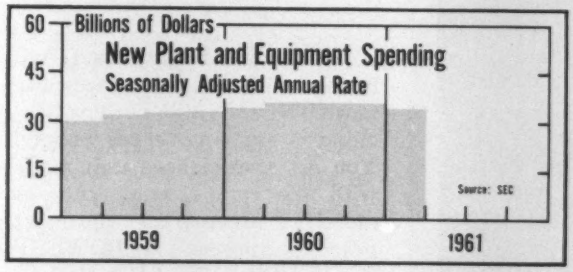
1960 Trends Not Yet Apparent

February now looks like the critical month—critical in that the business trend should be taking form by then. In spite of year-end forecasts, the pattern of business for 1960 is not yet apparent, and won't be until some of the issues are resolved.

For example, the moderate decline in capital spending predicted (see chart) for the first quarter could be erased. Or, it could develop into something more serious. The same goes for many other areas of the economy. The prevailing opinion is that mid-year will see the beginning of the upturn, but this is a most general conclusion.

Capital Spending to Dip

Capital spending for 1960 is taking on an uncertain look. Only a moderate decline is predicted for the first quarter. But through the second half of 1960, spending has not lived up to predictions. But 1960 will still end up with a healthy total of $35.75 billion, compared with the forecast of $37 billion for the year. This is up 10 pct from 1959.



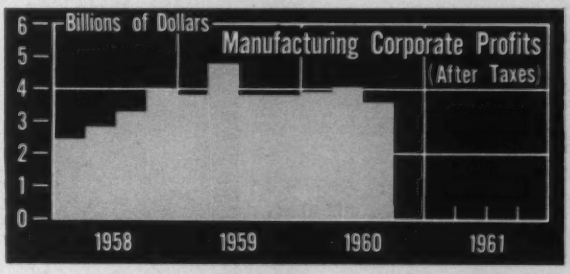
According to the quarterly survey of capital spending (Security and Exchange Commission-Dept. of Commerce), first quarter spending will be at the annual rate of $35 billion. Fourth quarter, 1960, rate is $35.5 billion.

Steel Production vs. Shipments

Steel shipment figures indicate mills have had to adjust their inventories in recent weeks. In October, ingot production was up 400,000 tons from September, but shipments were down 40,000 tons. The buildup from this gap may explain why ingot production dropped in November. However, December steel production is believed to be running on a par with shipments, or possibly a bit above.

Correction Hit in 3rd Quarter

Third quarter earnings of manufacturing companies show how the correction period began to make itself felt in the July-September period. With the fourth



quarter no better for most (worse for some industries), the seasonal lull has become a more severe slump.

Third quarter profits, after taxes, of all manufacturing companies totaled $3.6 billion. This compares with $4.08 billion in the second quarter. Probably hardest hit were the automakers, who were affected by changeovers. Motor vehicle earnings dropped from $504 million to $191 million. But with the fall auto upsurge, the drop should be recovered. Not so with the steelmakers, however. Second quarter profits of $263 million were cut in half. And with the slump continuing, no recovery is in sight.

Will Consumers Reverse the Trend?

Consumer spending may be ready to pick up pace and reverse the business downtrend. At least one business optimist is taking that position. W. W. Tongue, economist for Jewel Tea Co., last week told the House-Senate Economic Committee that consumer buying will pick up, but at a rate "relatively less vigorous" than in some past recovery periods.

An Assist from "Buy at Home"

American metalworking industries will get a mild shot in the arm from the government's latest "save-the-dollar" move. U. S. orders that countries receiving U. S. foreign aid cannot spend it in 19 economically strong countries should funnel a good deal of the funds to U. S. industries.

The State Dept. order requires nations to use their aid funds to purchase machinery and other capital goods either from under-developed countries or from the U. S. Some $400 million is involved.

HERE'S DRILLING AUTOMATION ...dirt cheap!

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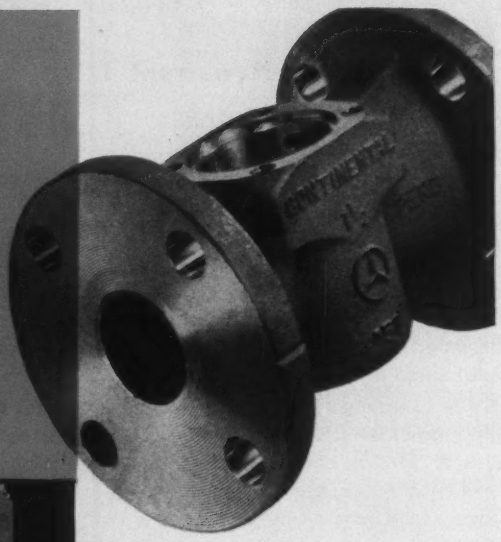

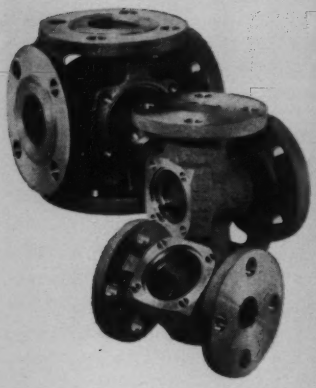

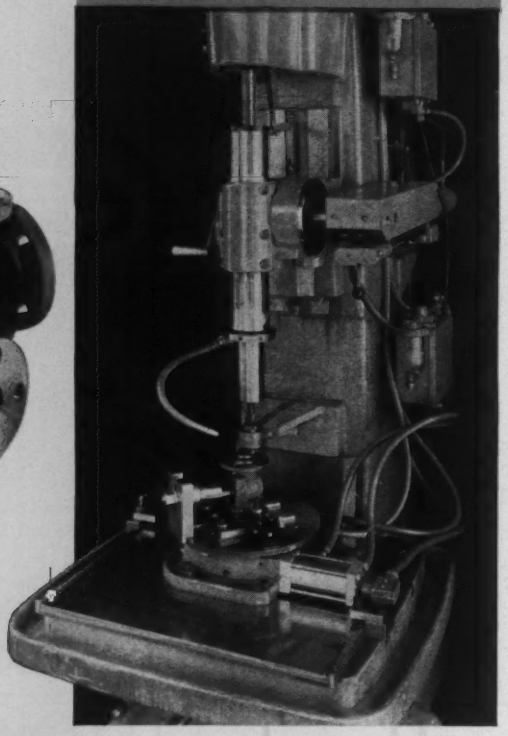

Problem: "On this Continental Manufacturing job, we have various valve body sizes in tough-machining materials, hole diameters to ¾", and small lot runs up to 25 pieces. To make it a profitable operation, we must have low-cost equipment with fast setups for quick changeovers."

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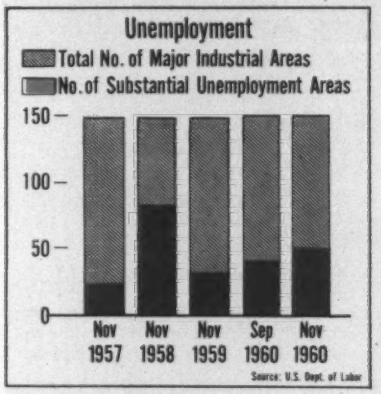
November Employment Situation Worsened

Between September and November, nine industrial areas were added to the list of major areas with



a "substantial labor surplus" (more than 6 pct jobless).

There are now 51 of 150 major labor areas in this classification, according to the Bureau of Employment Security. In the same month last year, there were 32 centers, and in November of 1958 there were 83 with substantial unemployment.

The Bureau's November survey also shows employment dropped in 60 pct of the 150 major industrial areas.

Last week, S. L. Wolfbein, Deputy Assistant Secretary of Labor, told the Joint Economic Committee that barring any changes in the employment situation, his seasonally projected unemployment chart shows unemployment will be as follows: November, 4,088,000; December, 4,247,000; January, 5,187,000; and February, 5,282,000. It tapers off in March and April.

IUE: An Undue Burden

NLRB agrees with trial examiner that there is a limit to the amount of data unions can demand of a company. It affirmed that Westinghouse Electric Corp. didn't violate Taft-Hartley Act by not meeting demands of IUE for certain employee average earnings data. It said the demand for data on wages, hours worked, employment, layoffs, etc., covering 23 bargaining units in 17 plants from 1956 to present was "unduly burdensome."

USW: Will Steelworkers Strike in 1962?

The more the profit squeeze hits steel, the more chance there is of a strike in July 1962.

Steelworkers officials don't believe that foreign competition and competition from other materials are serious enough for them to postpone union demands at the next negotiations.

Steelmakers are unable to get a price increase now, so medium and small companies are being harder hit by wage costs than at any time in recent years. Necessity dictates resistance to wage and fringe increase demands in the 1962 meetings.

Also, if no price relief comes, some steel companies may have to liquidate—unless they can get their costs down.

Labor unions are in no mood to cooperate to the extent of declaring a moratorium on wage-fringe demands. Closest they might come is to angle for some formula to distribute part of profits in the form of high incentives. But this idea will probably run up against management's stone wall.

UAW: Spadework for 1961

The UAW is calling its first major conference to work out the demands it will lay down to the auto industry next summer.

About 1000 local delegates and officials are gathering at Chicago this week for the 8th annual Skilled Trades Dept. convention. They will concentrate on contract aims important only to their trades. But resolutions and speeches by top UAW leaders will deal with the overall bargaining program for 1961.

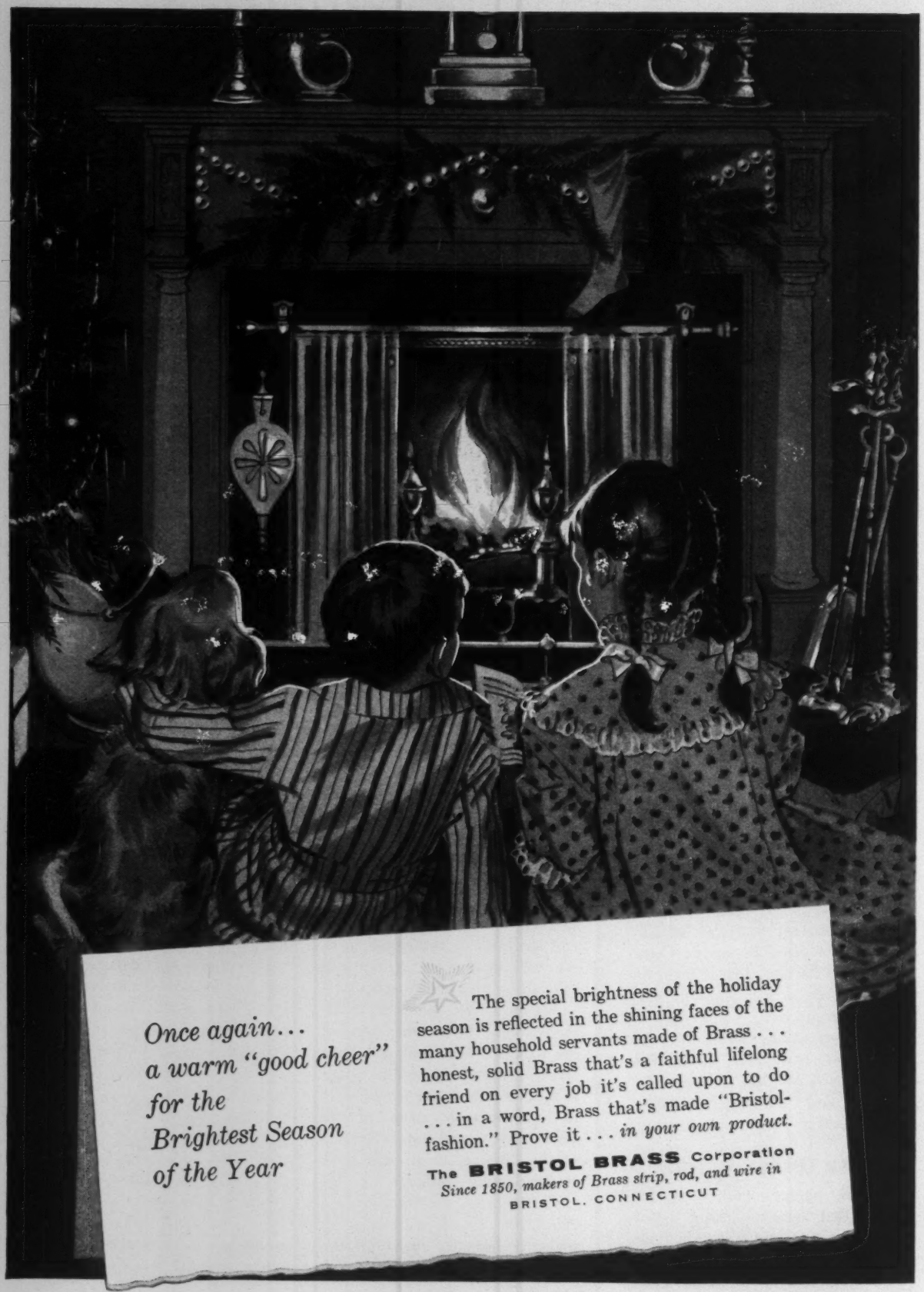
Pre-bargaining planning is already underway in other parts of the UAW. The national Ford Dept. is staging regional meetings to talk over demands for changes in non-economic parts of the Ford-UAW agreement. Members of the Chrysler Dept. staff have started similar studies.

On Dec. 14, the International Executive Board will meet to make preliminary plans for the special bargaining-year convention, April 26-28. The April meeting will wrap up the demands which will be presented to GM, Ford, and Chrysler when auto industry bargaining begins in late June or early July.

Big Three contracts run out Aug. 29. American Motors' pact expires Sept. 9, Studebaker-Packard's Nov. 30.

Demands by skilled union trades group of the Big Three vary, but generally call for a base rate for all skilled job classifications, fixed on the highest present prevailing rates of pay. Another demand is recognition of a UAW journeyman card as proof of journeymanship.

Some units hard hit by unemployment are seeking a 30 hr week with 40 hr pay. Others are demanding the UAW sign no contract with any company in 1961 for longer than two years compared to the present three year contracts.



Once again...
a warm "good cheer"
for the
Brightest Season
of the Year

The special brightness of the holiday season is reflected in the shining faces of the many household servants made of Brass . . . honest, solid Brass that's a faithful lifelong friend on every job it's called upon to do . . . in a word, Brass that's made "Bristol-fashion." Prove it . . . *in your own product.*

The **BRISTOL BRASS** Corporation
Since 1850, makers of Brass strip, rod, and wire in
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★ Symington Plan Attacked

An underground battle over drastic defense reorganization plans has begun. It may end up being the first test of President-elect Kennedy's influence over Congress.

Behind the scenes, high ranking military leaders and their congressional backers are already preparing to fight the sweeping defense changes proposed to the new President by Sen. Stuart Symington.

Sen. Symington's plan is more drastic than anyone expected. It calls for abolition of Army, Navy, and Air Force secretaries through elimination of the three service structures. It would abolish a score of other top civilian jobs.

The report stresses that the three services would remain separate military divisions. But it is evident that the proposals would carry the Armed Forces close to a complete merger.

In the all important money field, the report suggests all defense funds be appropriated directly to the defense secretary and not the individual services. It calls for concentration of all armed services procurement under one director.

Service merging is the basic point of contention. Powerful congressmen continually have opposed unification of the military services. They will be ready when the proposal goes before Congress, which must approve it. The Navy has fought merger ideas tooth and nail. The strong Navy lobby will throw every pressure against the plan.

Thus the battle awaits President-elect Kennedy. It is now underground because the President-elect has not indicated how much of the Symington blueprint he will accept. But there is no doubt much of it is to his liking.

One of the opposition's major arguing points is Sen. Symington's claim that the reorganization could cut defense spending by $8 billion a year, more than 20 pct of the defense budget. Even non-military spending experts believe this is a great overstatement.

Military men say the only way that much money could be saved would be by making huge cuts in manpower and weapons buying.

■ Consumers Begin To Ease Pursestrings

Government economists say U. S. consumers are making more money these days but spending less of it. But they feel the tide is beginning to shift.

Experts say that penny-wise shoppers will spend more now that the uncertainty of the election year has faded. Present trends and history don't back them up.

President Eisenhower's economic advisors say people are saving better than eight cents out of every dollar, about a penny more than last year.

Spending for durable goods, including autos, major appliances, and hardware items, is about $2 billion less than 1959. Historically, post-election years are bad business years. In fact, they are usually worse than election years.

■ Write-Off Bill Ready for Congress

A bill giving businesses a one-year tax write-off of up to $1 million for new tools and equipment purchases will be introduced in Congress next session by Rep. Wright Patman, D., Tex.

The bill will have two basic parts, Rep. Patman says: (1) Enlarging present depreciation allowance to cover the first $1 million of newly acquired capital equipment; (2) Shorten the depreciation period to one year.

■ FRB Won't Budge Easily

If President-elect Kennedy plans to use the power of his office to influence U. S. money policies he won't go unchallenged. Federal Reserve Board (FRB) officials are ready to fight.

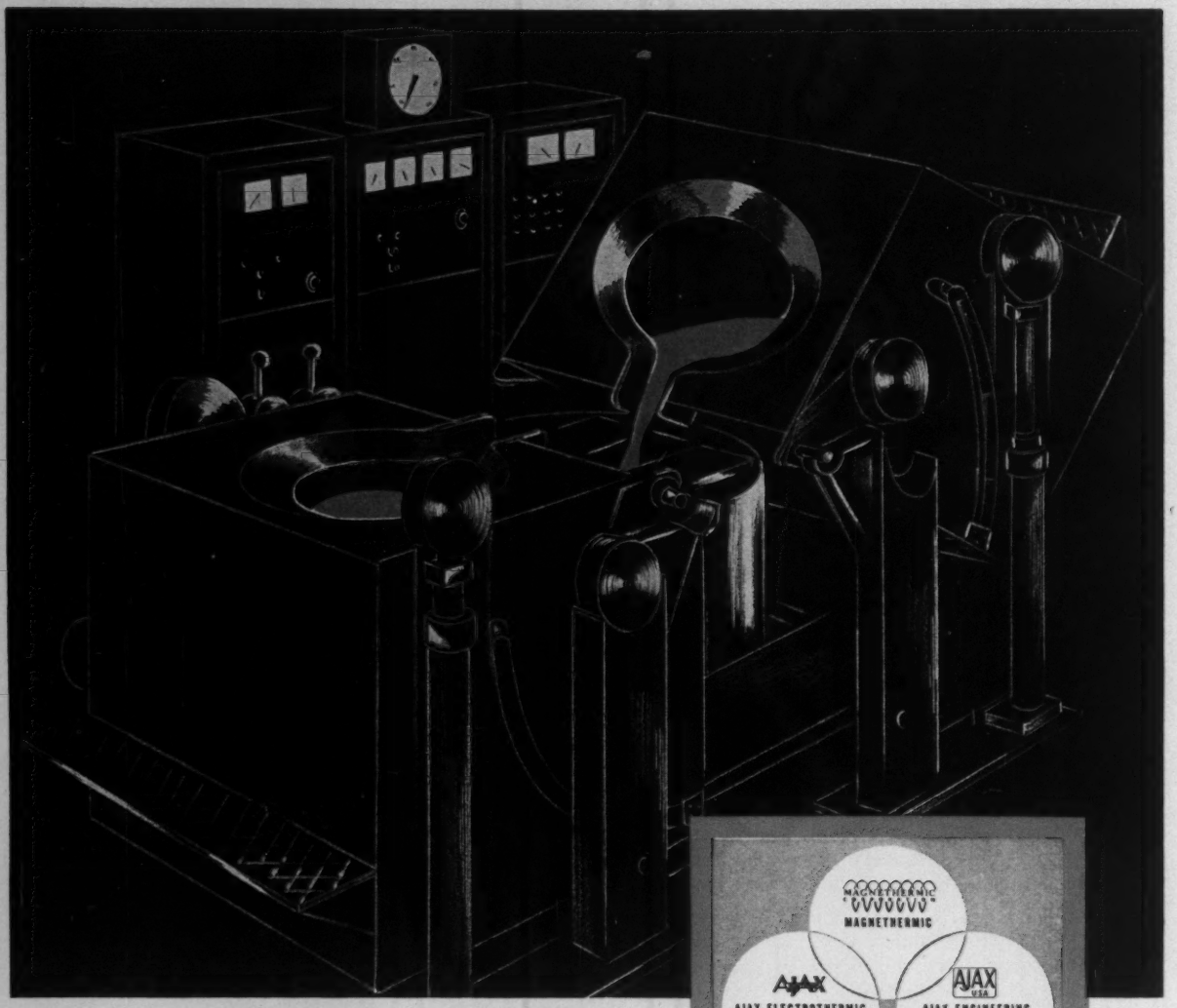
Sen. Kennedy has indicated he will change credit and interest rate policies, which are in the bailiwick of the FRB. Sources close to the FRB say William McChesney Martin, chairman of the board, will fight back if Kennedy goes beyond the usual consultations and expressions of views.

Mr. Martin has had showdown battles on interference before, with Congress and the Eisenhower Administration. He won.

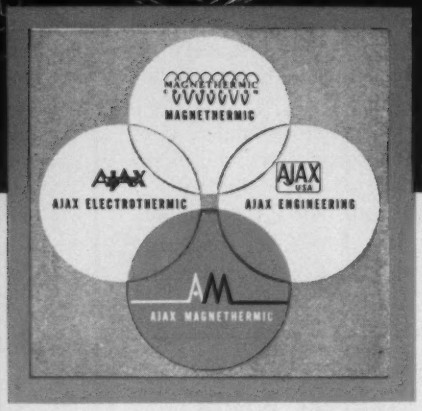
■ Depressed Area Plan to Be Rushed

A crash program to spur growth in areas of chronic unemployment is in the works. President-elect Kennedy, as he promised in the campaign, has a citizen's committee working on a model program for aid to depressed areas.

The committee will try to point out ways to develop new job opportunities in the areas, remove roadblocks to full development of industrial potential, and stimulate investment in new industry. The program will be turned into legislation and will get quick action in Congress.



These twin 1000-lb. melting furnaces prepare copper for metal powder at the St. John's, Michigan, plant of Federal-Mogul-Bower Bearings, Inc.



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"induction heating is our only business"

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Ford's Overseas Move Is Now 'Official'

Ford Motor Co. has made its first "official" move to take over its British subsidiary.

The move came last Friday when the first of the formal offers was mailed to stockholders of the English company. It will probably be another week before the final offer is mailed out. The move was made despite a request made of Henry Ford II, Ford Chairman, by Treasury Secretary Robert B. Anderson that the plan be "studied."

A spokesman for Ford's International Div. told The IRON AGE the company will make no comment on the details of the financing. However, most reports say the company is offering $20.50 per share for the 17,726,804 shares it does not already own. This totals more than $360 million.

Permission by the British Treasury for the bid touched off a storm of protest by Laborites in England's House of Commons. It appears that most stockholders will readily sell.

Estimates are that it will be mid-January before all the offers are returned. Therefore, it will probably be late in January before Ford makes public the financial arrangements of the move.

Already American auto companies have captured almost half of the British market, with Ford and General Motors Corp.'s Vauxhall the leaders. Ford of England sales in 1959 were an all-time high of $653 million.

Even with these sales, there are a few unanswered questions. Ford might see certain tax advantages, among other things, to a wholly-owned subsidiary. However, with plants and operations also in Canada, Germany, Latin America and the Middle East, Ford is probably thinking beyond any tax reasoning to flexibility.

VW, Simca Expect More U. S. Sales

While the American auto industry is confident U. S. drivers will abandon foreign cars, Volkswagen of America and Simca, the French economy car, are making optimistic sales predictions for 1961.

J. Stuart Perkins, general sales manager of VW here, says nearly 200,000 Volkswagens will be sold in the United States during this auto season. If his prediction is correct, VW will sell 15,000 more cars in the U. S. in 1961 than it did in the past season.

VW: More U. S. Sales?

"And 1960 sales are 39 pct ahead of 1959 sales," notes Mr. Perkins. He says further, "Last year our share of the import market was about two of every ten vehicles. This year we're at the three-in-ten level."

And Volkswagen, according to Mr. Perkins, has plans for increasing its dealer network from 540 to more than 600 independent dealers in the United States next year.

Outlining Simca's plans, L. A. Townsend, new administrative vice president of Chrysler Corp., says, "We're in this program for keeps. There's a continuing good demand in the U. S. for imported cars in Simca's price range and we're continuing to build a strong Simca dealership organization."

He also notes, "The fact that imports are continuing to sell 40,000 cars a month in this country, indicates a strong, continuing demand." Chrysler owns about 25 pct of Simca.

Crude Aluminum Exports Climb

The United States continues to export crude aluminum and aluminum scrap at rates more than triple those of 1959.

According to figures recently released by the Dept. of Commerce, crude aluminum exports in September totaled 31.8 million lb. This is a drop of 26.8 million lb from the August figure, but the nine-month total this year is already 450.7 million lb. Crude aluminum exports in 1959 only totaled 130.9 million lb.

The story's the same for aluminum scrap exports. The nine-month total is 31.1 million lb, compared to 1959's 21.7 million lb.

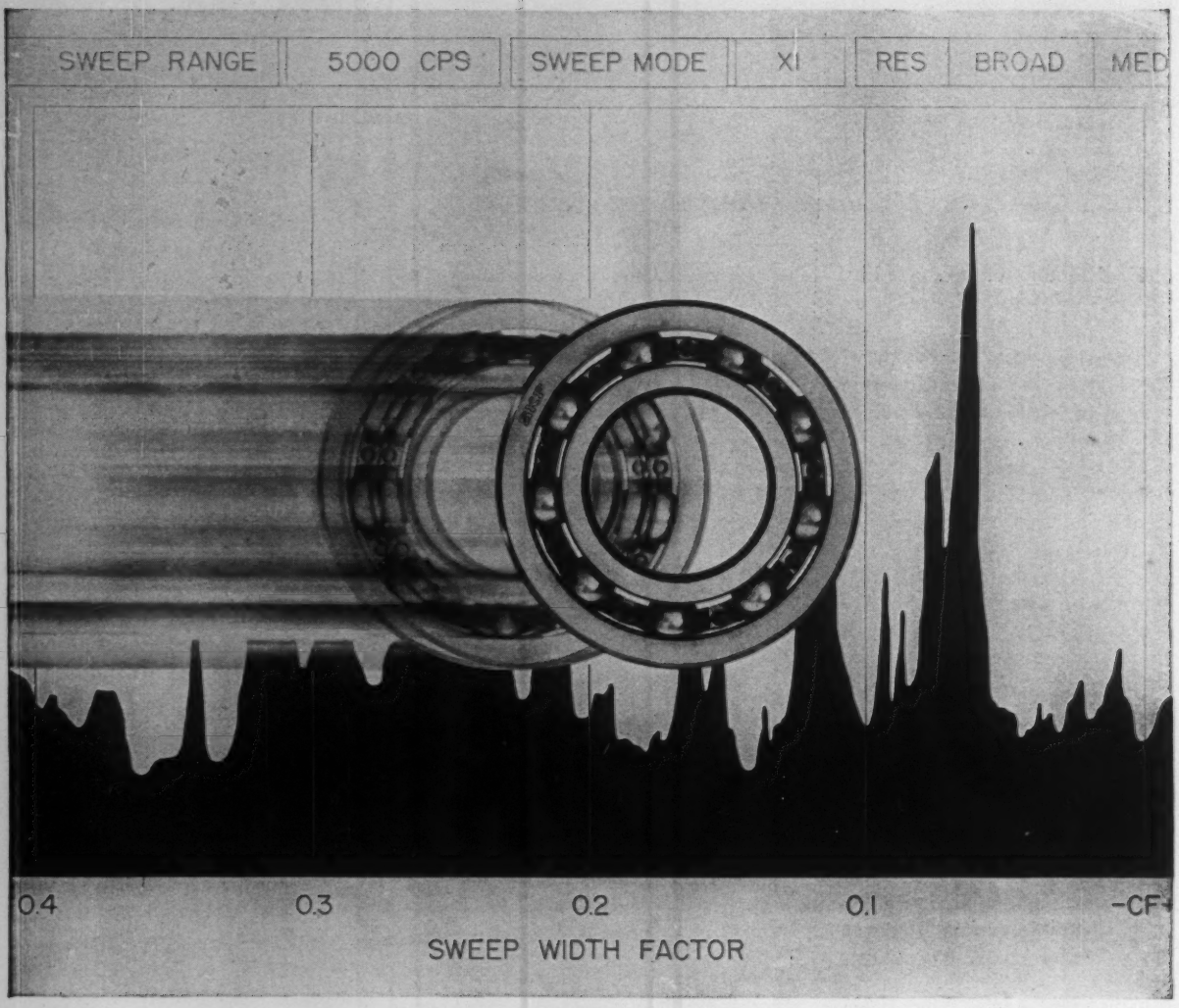
And the import rate of crude aluminum is down considerably. A total of 225.3 lb had been imported through September as compared to last year's 362.8 million lb.

French Machine Tool Sales, Exports Up

Henri Huret, president of the French Federation of Machine Tool Constructors, says the French industry's production is up 25 pct from last year and that 25 pct of the production is going into export.

The French, says Mr. Huret, are putting the emphasis on small tools. And this emphasis paid off last year with record sales of $122 million.

Mr. Huret notes that while French machine tools are "very competitive on the world market, only an increase in domestic sales will enable our producers to turn out machines at low cost prices and thus expand the foreign market."



Now, SKF reduces the noise level of ball bearings by 50%!

New SKF ball bearings run twice as quietly as standard single-row deep-groove bearings — six times more quietly than bearings produced just two years ago.

They're designed especially for applications where noise is an important factor. Eight manufacturers, who use-tested them for over a year, now back-up their approvals with repeat orders.

Every bearing meets new, more critical standards. Each type and size meets special requirements for reduced vibration. Every ball meets very low waviness limits. Each cage meets critical standards for smooth, quiet performance.

SKF will make a comparison check of these improved bearings against the bearings you're now using. See for yourself! Just call the SKF branch office nearest you. 6013

Spherical, Cylindrical, Ball, Tapered and REED Miniature Bearings

EVERY TYPE—EVERY USE

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Controls Honing Tools

A hone with a built-in device for precise control of bore diameters has been designed by a Russian engineer. The control device consists of a water manometer, pneumatic gage and a photocell. Under spring pressure, feelers are placed against the honed surface. Movement of the feelers changes the manometer's fluid level. When the water level equals the desired diameter setting, the hole size is fixed. A single screw sets the gage.

Oxygen Blow Checks Carbon

While there are still some doubts from electric furnace veterans, at least one stainless producer is using length of oxygen blow to predict carbon content. The amount of carbon, as a function of oxygen blow time, is plotted as a constant curve. This chart method reduces the number of checks needed to monitor carbon content from five or six to two tests per heat.

Springs Resist 1800°F

René 41, a vacuum-melted nickel-base alloy, serves in springs which operate at 1800°F. Tensile strength, in the spring temper, ranges from 250,000-280,000 psi. Modulus of elasticity ranges from 31.6 million psi at room temperature to about 20 million psi at 1700°F.

Graphite Becomes Diamond

Using nickel as a catalyst, diamonds have been "grown" from graphite under a pressure of 1,249,500 psi at 1600°C. High pressure has been available for some time; but until now there have been temperature limitations. Newer equipment produces pressures up to 2,000,000 psi, while withstanding heats in excess of 3000°C.

Analyze Casting Tricks

Gating-system design is often considered a casting art. But it becomes a casting science if you apply hydraulic principles. Many so-called tricks are used to produce sound castings. Upon analysis, all tricks are shown to be applications of hydraulic rules. An ideal gating system includes: a pouring basin to prevent dross from entering the system; a tapered sprue with a well; gates from the top runners; and streamlined channels to reduce air turbulence within the metal.

Mist Lubricates Bearings

Oil-mist lubrication in roll-neck bearings boosts service life while reducing oil consumption. A mist system atomizes the oil into tiny particles. These particles are carried in the air stream and distributed through tubes to the new roll-neck bearings. This set up precludes damage which results from condensation. It also minimizes the effects of a corrosive atmosphere.

Metal-Forming Lubricant

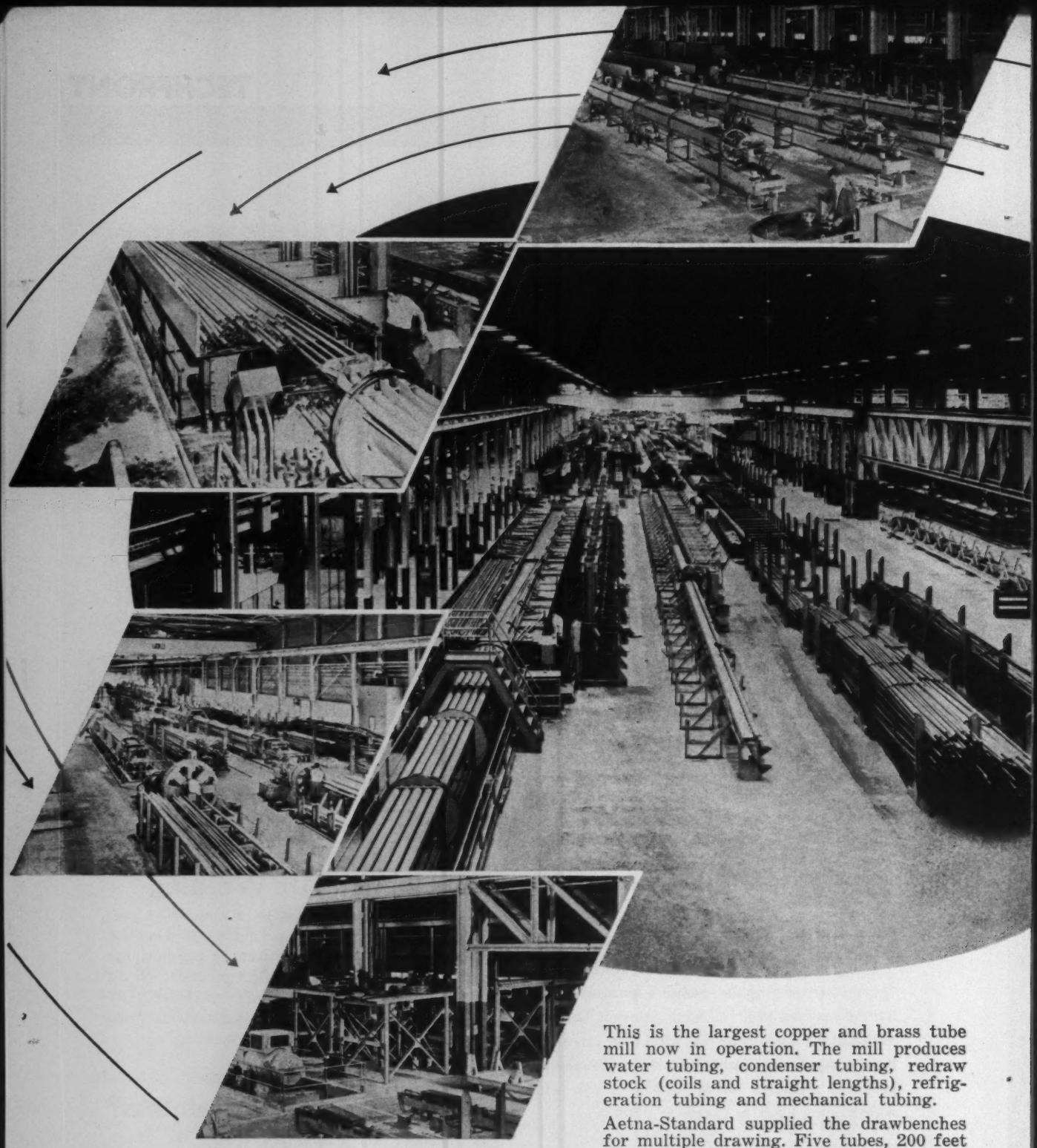
At temperatures from 1100°-2200°F, a powdered lubricant prevents galling, scoring and metal pickup in forming operations. The newcomer is an eutectoid, a gradually-softening mixture of phosphates and other salts. On hot surfaces it forms an adherent, spreading melt to lubricate forming tools and the metal that's being formed.

Mechanize Arc Welding

One of the major advances in automotive production this year centers on automatic handling, indexing and welding of brackets to axle housings by the innershield (corded-wire) process. Direct labor savings on transfer lines are halved. By extending automation, this process yields great savings over manual production welding.

More Hardenable Stainless?

Japanese steelmakers are testing the effects of boron in stainless steel. They've melted, forged and rolled stainless alloys containing up to 6.1 pct boron. Results indicate that alloys with less than 2 pct boron can be forged easily. With increasing boron content, toughness decreases. Stainless with 6.1 pct boron is so brittle it fractures when dropped on the floor.



BRASS and COPPER TUBE MILL...

This is the largest copper and brass tube mill now in operation. The mill produces water tubing, condenser tubing, redraw stock (coils and straight lengths), refrigeration tubing and mechanical tubing.

Aetna-Standard supplied the drawbenches for multiple drawing. Five tubes, 200 feet in length, are drawn in a single pass. Aetna-Standard also supplied high speed 60-inch Bull Blocks with turn-style coil handling.

For information on Cold Draw equipment, write to: Aetna-Standard Division
300 Sixth Avenue
Pittsburgh, Pennsylvania

Aetna-Standard Division

BLAW-KNOX

Give Up?

Sir—You win. I've spent a futile evening with my Dick Tracy code book, and still cannot decipher the Chicago and Northwestern Railway Co. notice as seen on p. 21 of the Nov. 24 issue. Please send us a copy for framing. — Jay Claster, Claster Steel Co., Inc., Williamsport, Pa.

Sir—The "Notice" reprinted in "Fatigue Cracks" (IA, Nov. 24, p. 21) very nearly caricatures writing turned in by many of my freshman English students, particularly those enrolled in business administration. Judging by my own experience with this so-called communication, the writer had no idea what he intended to say, and to conceal the fact wrote in the businesses which is still thought by some to be impressive English. Since no one of those who write similar "prose" for me even knows, later, what he meant by it, I offer that the "Notice" is untranslatable.

I intend to present the entire feature to my classes as proof that gobbledegook is not the quickest way to make the good impression that leads to the vague "success in life" of which many of them dream. Perhaps your clear and sane remarks on communication, plus the murky appendage to them, may convince some skeptics that they'll need to write clear English to get where they'd like to go.—Jean MacIntyre, Kent State Univ., Kent, O.

▪ **Amen.—Ed.**

Taking Issue

Sir—As one of the most recent subscribers to your distinguished periodical, I may not be qualified to voice objection to specific presentations. However, I trust that you will not resent my taking issue to a statement made in paragraph 7 of the article, "Do You Make These Mistakes in Europe?" (IA, Nov. 10, p. 137). It is based upon my personal experience abroad for 27 years.

I observed that employees in general do not indulge in changing jobs throughout central Europe. Anyone who does so more than once in, say, 35 years, is considered an adventurer, a professional desperado, or, at least, a nuisance. This is quite contrary to the perpetual position-hunting common in this country. I can still contact individuals abroad who hold essentially the same position that they occupied when I left Europe 23 years ago, provided they survived per se, or the war.—Rudolf Steiner, Van Nuys, Calif.

▪ **Our report was based on experiences of several large U. S.-owned companies in Germany.—Ed.**

Appreciation

Sir—Permit me as a subscriber to express hearty appreciation for your editorials. The editorial in the Nov. 17 issue ("The Significance? The People Are Divided") is one of the best. I shall have several of my "non-mechanical" friends read it.—Francis J. Baumis, Townsend, Mass.

"Have one for the road, boys. That's what you're hitting."

for the best braze in the business... it's the

NEW AIRCOSIL FLUXCOR

Airco's new silver alloy wire, AIRCOSIL FLUXCOR, is the only wire available which has the flux incorporated within the core of the filler metal wire. It reduces or eliminates the time normally needed for separate fluxing of parts. It minimizes flux inclusions. It gives exactly the right amount of flux every time for a good strong joint – no more weak joints because of poor fluxing – no more wasted fluxing.

In addition, Aircosil Fluxcor minimizes the danger of voids resulting from improper pre-cleaning. It can be used readily by operators who have very little brazing experience. Aircosil Fluxcor has an alloy content which is equivalent to a 3/64″ diameter solid brazing wire.

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Authorized Airco Distributors in most principal cities

National's Deac Scholl, sales manager, and Bill Curran, works manager, talk rolls by one of the largest ever cast, a 38½x160" plate roll.

Another example of National Roll quality control

We "live" with your rolls after shipment, too

National Roll has only one business: rolls. This product concentration has enabled National to build a sales, service and production staff with specialized knowledge of roll making. Experienced men give every roll order placed with National "personalized" attention, all the way from consultation with the customer before the order is placed to follow-up on the roll's performance throughout its service life.

This emphasis on customer service is one reason for the confidence so many steel makers are placing in National as a supplier of steel, nodular iron and cast iron rolls.

A new brochure entitled "This is the New National Roll" explains many more of National's unique advantages as a roll supplier. We will be glad to send you a copy. It shows you why . . .

National's the growing name in rolls

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General Steel Castings Corporation, General Offices: Granite City, Illinois • Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.

Inside Story

Every now and then, we are reminded of the wide area covered by our metalworking industry.

Just recently at a luncheon in the Midwest, we sat next to an executive whose company is prominent in a strange (to us, at least) field—jails and prisons.

The company has a broad range of product interests, but one is the manufacture and design of security systems for prisons. We hadn't thought of it before, but we were reminded that construction of a prison is one of the most highly complicated projects in the world.

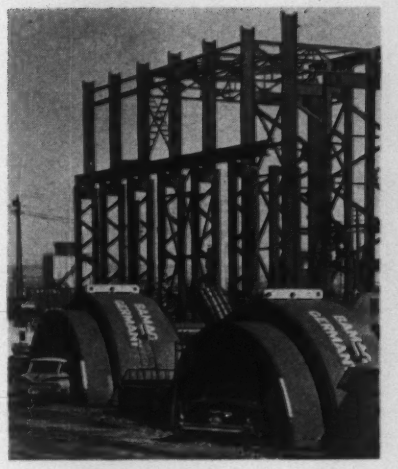
The Full Life — Probably only several thousand of this businessman's friends will recognize him. But we didn't clear these comments with him and, in fact, the luncheon speeches were off the record. So we won't identify him by name.

But he points out a prison must contain all the features for the inmate's full life—not just sleeping, like a hotel, nor his working day, like an office—but his entire 24 hours, day after day, year after year.

User Approval — And it must have a highly complicated security system so cell blocks and doors can be controlled centrally as well as locally. It's a big field, we now recognize.

But another sidelight interested us. The company is justifiably proud of its work, and it has the best possible testimonial: Many inmates are so impressed by its product that they believe it must be a good company to work for. And not a few make job applications with the company after their time is up.

Some are hired, with results that, as near as we can tell from a noncommittal answer, are neither outstandingly good nor bad, but about average for any employee group. We'll leave that up to the sociologists.



Expensive Carports

Despite appearances, the structures shown above are not imported garages. Actually they are sections for oxygen steelmaking vessels at Colorado Fuel and Iron Corp.'s Pueblo., Colo. plant.

Construction crew members, working on CF&I's new basic oxygen steel unit, decided to use the 52-ton sections — temporarily — as garages.

When installed the vessels will weigh 310 tons each and will be able to turn out, at capacity, 100 tons of steel about every 45 minutes.

Stow That Trash

Civic pride is reaching new heights in Philadelphia and metals have a part in it. Latest move is an anti-litter drive to keep the city's streets tidier.

Metal trash baskets painted in seven different pastel colors have been placed on the streets. It's an experiment to find out which color trash cans will attract the most litter. City press representatives told The IRON AGE it's too early yet to announce results.

An added thought: Since tossing cigarette butts away is now frowned on, how about ash trays attached to the trash baskets as some people have advocated?

STRIP COATING

Aluminum, Steel with

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PROMPT QUOTATION

FAST DELIVERY

Beautifies. Protects. Resists abrasion, corrosion, crazing, cracking, and acid and salt in the atmosphere.

Adds luster and richness. Withstands sharp bending and die-forming. Clear or color—stock or custom hues. Exact conformance with your specifications.

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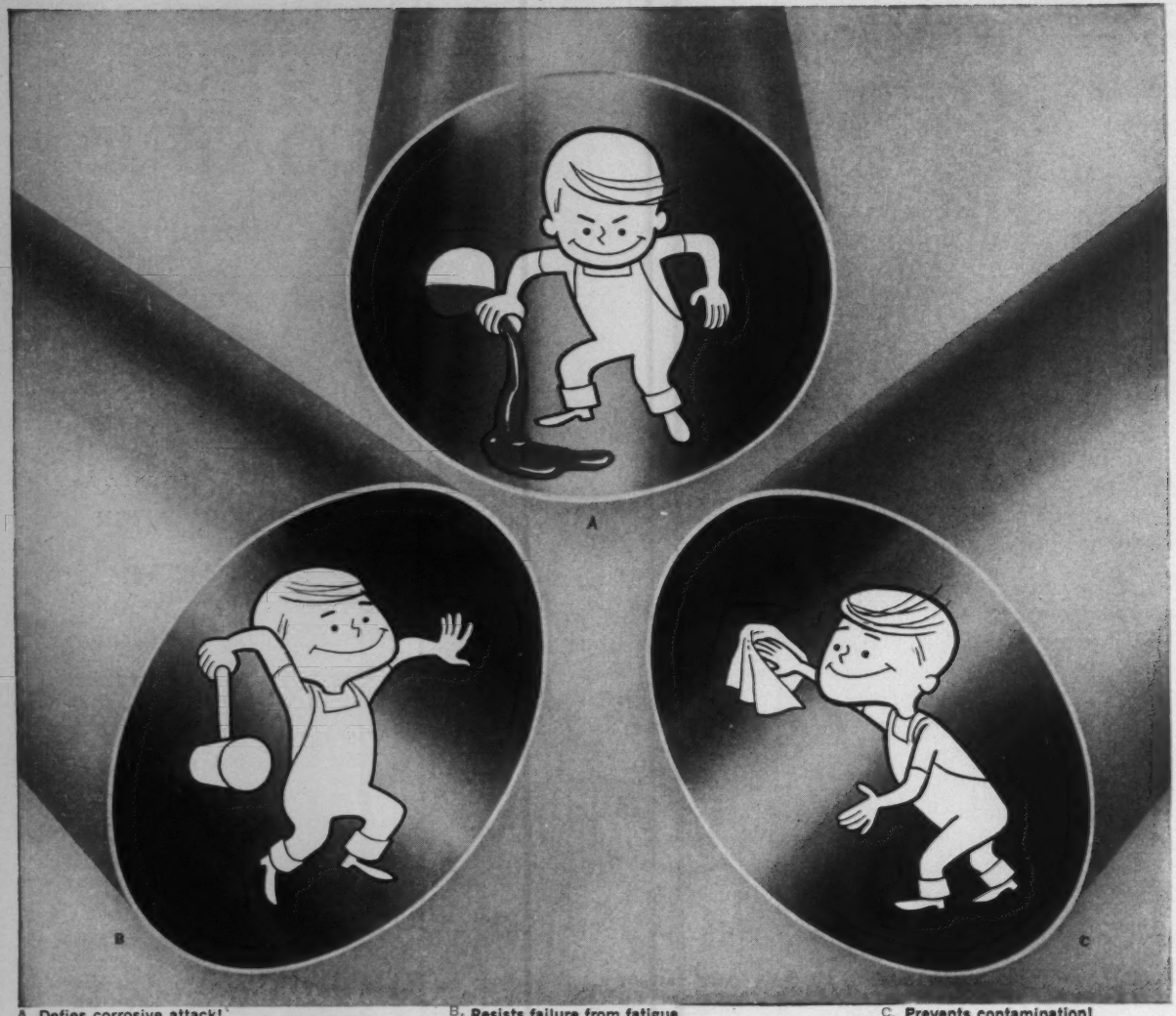
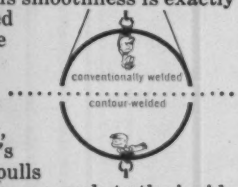


A. Defies corrosive attack! B. Resists failure from fatigue C. Prevents contamination!

The "Gravity Kid" shows how
ONLY CONTOUR-WELDING COMBINES ALL THREE BENEFITS IN A SINGLE TUBE

Feel the inside surface of a Contour-welded* stainless tube. It's so smooth you barely feel the weld. Even with a microscope you see fewer crevices and flaws than you find in other makes of tubing. This smoothness is exactly the reason why Contour-welded tubing is so resistant to corrosive attack...to product incrustation ...and to failure from fatigue.



Contour-welded tubing is smoother than other tubing, welded or seamless, because it's welded at the bottom. Gravity pulls the metal down so that the weld corresponds to the inside contour of the tube. There's no bulge on the inside surface. Even on the outside surface, the seam closely conforms to the tubing shape.

Just the opposite occurs in conventionally-welded tubings. There, gravity pulls the molten metal down into the tube. This can form a bead that is difficult to remove by cold working. And cold working can lead to undercuts that become focal points for corrosive attack, incrustation, and even failure from fatigue.

Contour-welded tubing is smoother than seamless. That's because it's formed from uniformly rolled strip steel, whereas seamless must be produced by extruding or piercing.

But get the full story. Write today for our free 48-page manual, which describes tubing sizes from 1/8" to 40" O.D., in stainless and high alloy steels, titanium, zirconium, zircalloy, and Hastelloy**.

*Trent's patented process — U.S. Patent 2,716,692

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Trent Tube Company, a Subsidiary of Crucible Steel Company of America, General Offices and Mills: East Troy, Wisc.; Fullerton, Calif.

COMING EXHIBITS

Plant Maintenance & Engineering Show—Jan. 23-26, International Amphitheatre, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

International Heating & Air-Conditioning Show—Feb. 13-16, International Amphitheatre, Chicago. (International Exposition Co., 480 Lexington Ave., New York 17.)

MHI Pacific Coast Show—Feb. 22-24, Cow Palace, San Francisco. (Material Handling Institute, Inc., One Gateway Center, Pittsburgh 22.)

Western Metal Show—March 20-24, Pan Pacific Auditorium, Los Angeles. (American Society for Metals, Metals Park, Novelty, O.)

MEETINGS

JANUARY

The Institute of Scrap Iron & Steel, Inc.—Annual convention, Jan. 8-11, Hotels Fontainebleau and Eden Roc, Miami Beach, Fla. Institute headquarters, 1729 H St., N. W., Washington 6, D. C.

Aluminum Window Mfrs. Assn.—Annual meeting, Jan. 9-12, Emerald Beach Hotel, Nassau, Bahamas, Association headquarters, 630 Third Ave., New York.

Society of Automotive Engineers, Inc.—Annual meeting, Jan. 9-13, Cobo Hall and Convention Arena, Detroit. Society headquarters, 485 Lexington Ave., New York, N. Y.

Hoist Manufacturers Assn., Inc.—Annual meeting, Jan. 10, Statler Hotel, Cleveland. Association headquarters, One Thomas Circle, Washington.

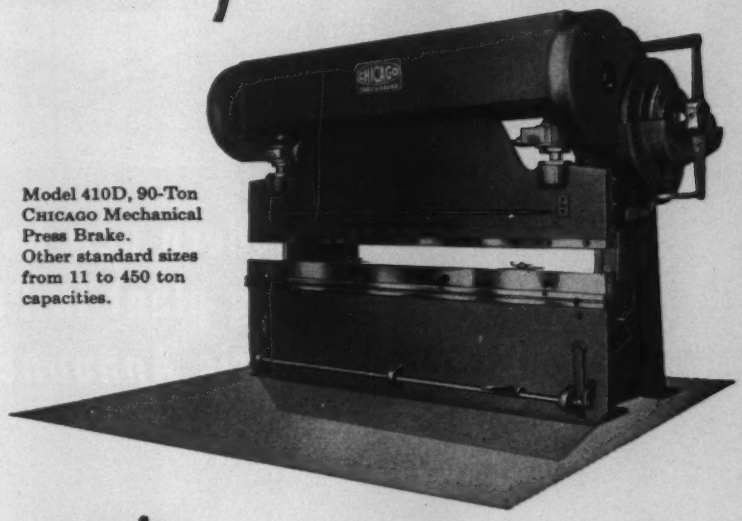
Steel Shipping Container Institute, Inc.—Winter meeting, Jan. 17-18, St. Regis Hotel, New York. Institute headquarters, 600 Fifth Ave., New York.

Steel Plate Fabricators Assn.—Annual meeting, Jan. 18-20, Logo

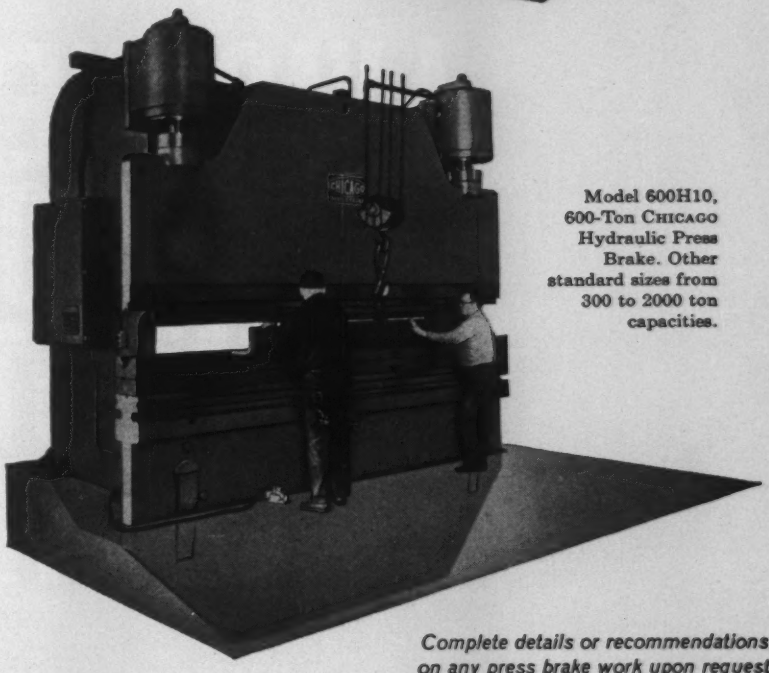
(Continued on P. 24)

CHICAGO® PRESS BRAKES

unexcelled accuracy / *for sheet metal and plate work*



Model 410D, 90-Ton CHICAGO Mechanical Press Brake. Other standard sizes from 11 to 450 ton capacities.



Model 600H10, 600-Ton CHICAGO Hydraulic Press Brake. Other standard sizes from 300 to 2000 ton capacities.

Complete details or recommendations on any press brake work upon request

8430

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Press Brake Dies
Straight-Side-Type Presses
Hand and Power Bending Brakes
Special Forming Machines

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From this modern new headquarters and manufacturing plant in Phoenix, Arizona General Electric *Announces...*

A VAST NEW EXPANSION IN COMPUTER FACILITIES

★ New Information Processing Center

■ New Sales Office

● Existing Sales Office

GENERAL ELECTRIC COMPUTER DEPARTMENT ADDING

11 NEW INFORMATION PROCESSING CENTERS AND 10 NEW SALES OFFICES TO THE 16 SALES OFFICES NOW OPEN!

To better serve your computer needs, eleven new Information Processing Centers will be opened within the next year-and-one-half in addition to the two Information Processing Centers now operating in Arizona. Site surveys are proceeding in seven other key cities for additional processing centers. Ten new computer sales offices will be added to sixteen now open (General Electric presently operates offices in 350 key cities throughout the U.S.).

These vast expansions of facilities, manpower and actual operating computer systems are the direct result of customer confidence in the General Electric Company Computer Department and the great expansion of the computer industry as a whole.

General Electric's competence in the computer field is the product of 40 years' experience. General Electric provides computing and information processing systems for business, industry, science, engineering, education and defense.

If you are considering the application of a computer to your firm's operation, contact the existing Computer Department sales office nearest you or write directly to:

General Electric Company • Computer Dept. • 13443 North Black Canyon Highway • Phoenix, Arizona...today!

EXISTING SALES OFFICES:
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NEW SALES OFFICES:
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Detroit, Michigan
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Minneapolis, Minnesota
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NEW INFORMATION PROCESSING CENTERS:
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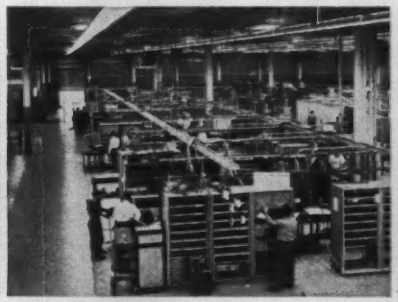
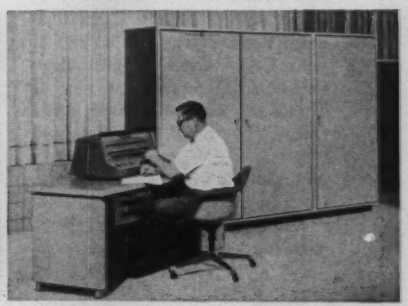
General Electric—Pioneer in computer systems for all phases of business, industrial, scientific, engineering and financial endeavor.

Nation's first MICR* Information Processing Center... with GE 210 computer system.



General Electric computers on test in modern manufacturing facilities.



GE-312 control computer now operating in various industrial applications.

*Magnetic Ink Character Recognition

Progress Is Our Most Important Product

GENERAL ELECTRIC

CPA36 (10-60)

SINCE 1903

PUNCHES • DIES • RIVET SETS
COMPRESSION RIVETER DIES

Write for Catalog 60 and Stock List

MANY FAST'S HAVE BEEN WORKING LONGER THAN YOU

It's a fact. There are plenty of cases where Fast's Couplings have been in service 20 to 40 years. And some of our more enthusiastic engineers say a Fast's should last forever if it's properly applied, installed and lubricated. Whatever opinion you accept, you can bet Fast's Couplings will give you the same smooth-running, low-maintenance, long-lived performance that makes them the choice of more equipment manufacturers than any other gear-type coupling.

For example, Fast's Coupling No. 1347, shipped in July, 1922, is still in service—and the customer is just ordering his first spare coupling 38 years later.

KOPPERS COMPANY, INC., 212 Scott Street, Baltimore 3, Md.

KOPPERS
FAST'S COUPLINGS
Engineered Products Sold with Service

MEETINGS

(Continued from P. 21)

Mar Hotel, Fort Lauderdale, Fla. Association headquarters, 105 W. Madison St., Chicago.

Industrial Heating Equipment Assn., Inc.—Annual winter meeting, Jan. 23-24, Dearborn, Mich. Association headquarters, 2000 K St., N. W., Washington, D. C.

Instrument Society of America—Annual meeting, Jan. 23-25, Hotel Astor, New York. Society headquarters, 313—6th Ave., Pittsburgh.

Society of Plastic Engineers, Inc.—Annual technical meeting, Jan. 24-27, Shoreham & Park Sheraton, Washington, D. C. Society headquarters, 65 Prospect St., Stamford, Conn.

National Tool & Die Manufacturers Assn.—Winter board meeting, Jan. 24-28, Biltmore Hotel, Palm Beach, Fla. Association headquarters, 907 Public Square Bldg., Cleveland.

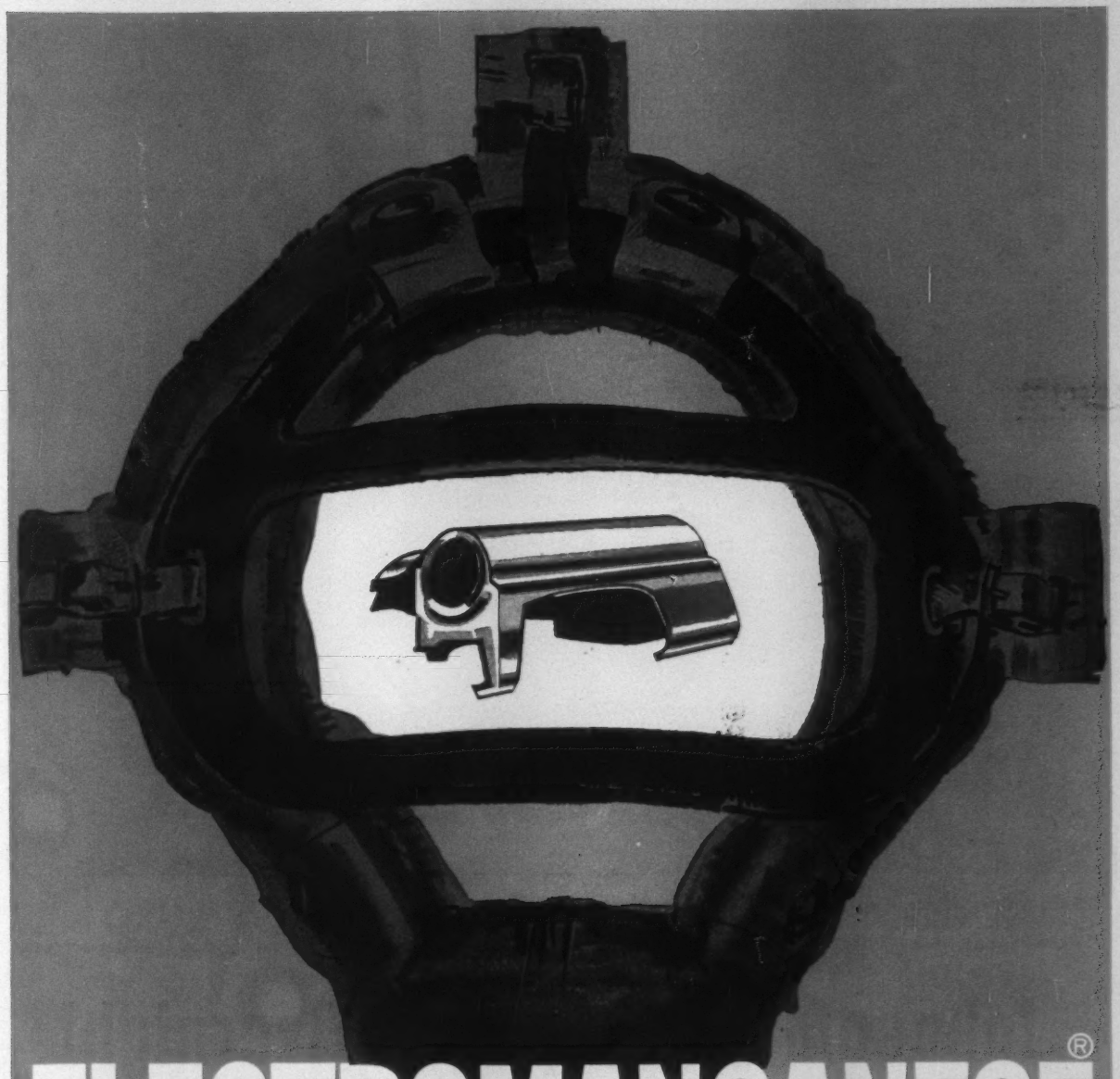
Metal Lath Manufacturers Assn.—Meeting, Jan. 25-26, Pick-Carter Hotel, Cleveland, Association headquarters, Engineers Bldg., Cleveland.

Cutting Tool Manufacturers Assn.—Annual business meeting, Jan. 26, Harmonie Club, Detroit. Association headquarters, 1216 Penobscot Bldg., Detroit.

National Assn. of Secondary Material Industries, Inc.—Midwestern Div. regional meeting, Jan. 26, Statler-Hilton Hotel, Detroit. Association headquarters, 271 Madison Ave., New York.

Truck-Trailer Manufacturers Assn., Inc.—Annual convention, Jan. 29-Feb. 1, Hollywood Beach Hotel, Hollywood, Fla. Association headquarters, 710 Albee Bldg., Washington, D. C.

Steel Kitchen Cabinet Manufacturers Assn.—Midyear meeting, Jan. 31, Sheraton Towers Hotel, Chicago. Association headquarters, 910 Park Bldg., Cleveland.

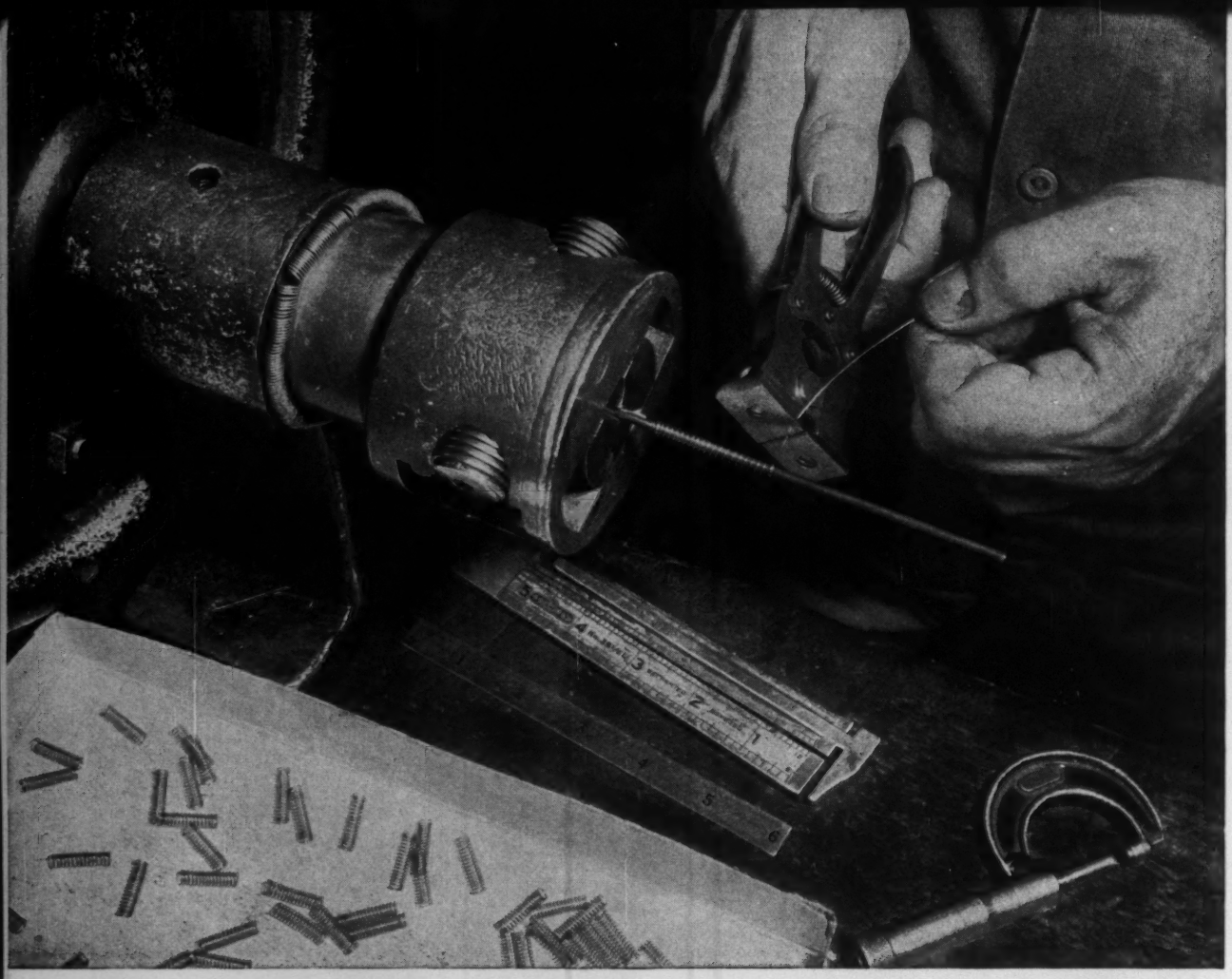


ELECTROMANGANESE®

PROTECTS DEEP DRAWING STEELS

FOOTE MINERAL COMPANY

Protect deep drawing steels from the harmful effects of carbon, silicon, and other impurities by standardizing on pure manganese—ELECTROMANGANESE. Get facts and prices by writing for Bulletin 201 to Technical Literature Section, Foote Mineral Company, 438 Eighteen West Chelten Building, Philadelphia 44, Pennsylvania, or Box 479, Knoxville 1, Tennessee.



Hand coiling of small spring orders is a skilled operation at The Yost Superior Co. in Springfield, Ohio. The company uses Johnson Music Spring Wire exclusively. Here, worker coils .012 wire into a compression spring with 16 coils having an O.D. of .196 inch. Small orders are filled overnight in this department.

Johnson Wire Speeds Overnight Delivery Of Handmade Springs

A spring maker who built a flourishing business by filling small orders practically overnight uses Johnson Steel & Wire Company's Music Spring Wire exclusively.

President L. V. Barnes of The Yost Superior Company, Springfield, Ohio, says flatly:

"Johnson Music Spring Wire is best." Since 1924, when a merger of Superior Spring Co. and Yost Gearless Motor Co. formed The Yost Superior Co., the firm has concentrated on producing custom-made springs and wire forms.

In one day recently, five telephoned orders for small lots of springs all specified the quickest possible delivery. "Three of those orders went out the same day and the other two were shipped the next morning," said William H. Craig, secretary-treasurer who heads production and purchasing activities.

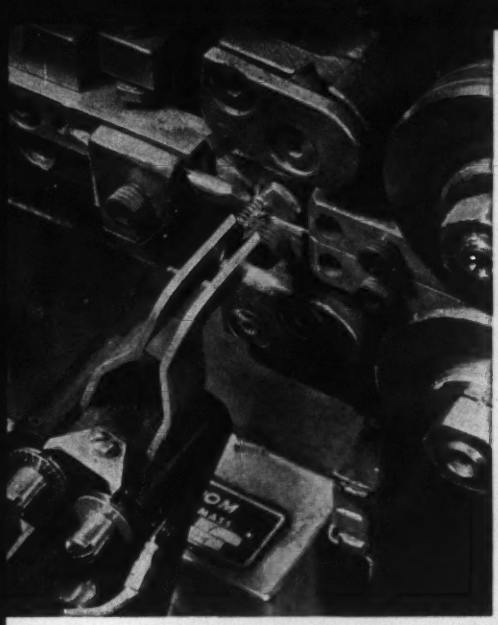
Three factors are all-important to Yost Superior. They are:

● **Spring Making Skill** — Yost Superior's bonus incentive plan, the long tenure of its employes and its steady growth for more than a half-century all demonstrate the company has a skilled work force which knows and practices the art of spring making.

● **Sizable Inventory**—Large wire stocks, usually running around 500 tons, are always on hand in Yost Superior's stock room. Mr. Craig said: "Our customers depend on us to supply their needs quickly. That means large stocks of wire sizes commonly used." He added:

"Johnson Music Spring Wire is so good—consistently—that we feel confident in laying in a large supply. We don't worry about quality varying from coil to coil or shipment to shipment. We can depend on wire we buy today to match the properties and performance of wire we bought a year ago.

"When we order from Johnson,



Electronic gager on this Torrington W10A Coiler measures to .005 inch in determining whether each spring coiled is the proper length. Springs rejected by the gager are blown to the side while good springs fall into container. Spring being coiled is made of .010 inch Johnson Music Spring Wire. It has an O.D. of .121 to .126 inch and is 5/16 inch long. It takes 1,000 springs to weigh a quarter pound.

Coiling a long spring on a Torrington W12A coiler from Johnson .120-inch diameter Music Spring Wire. The 95 coils in this spring measure 30-1/2 inches in length. Each coil has an O.D. of 1-1/16 inches.

we get quick delivery from warehouses in Akron or Chicago."

• **Good Raw Materials** — President Barnes said: "We demand the utmost in uniformity of diameters, finishes, tempers and physical properties. We get it from Johnson Steel & Wire Co.

"We don't have to ask for service. It's given us without asking. And Johnson Music Spring Wire has worked well for us. I would say their wire is the best. One hundred percent testing of finished springs proves it.

"We're accustomed to holding the diameter of springs — and often spring lengths — to tolerances stated in thousandth's, so we've got to have good wire. Johnson Music Spring Wire helps us meet specs and its performance helps us meet load requirements."

While Yost Superior makes springs in large production runs for everything from grass seed spreaders to missiles and rockets, its Hand Department is a key operation.

In the Hand Department where orders for less than 100 springs or wire forms are filled, Johnson Music Spring Wire proves itself.

Coiling springs by hand means high labor costs so it's important to keep them down to a minimum or the cost of making a few springs would go sky high. Here cost of the wire is insignificant but quality of the wire is most important.

• **Quality Comes Through** — That's because there's little or no time for experimenting or trial runs. The Hand Department pays off because the spring maker knows his business and uses Johnson Steel Wire with its predictable performance qualities.

Yost Superior uses the full range of Johnson Music Spring Wire from .008 inch diameter up to .250 inch to make all kinds of compression, extension and torsion springs as well as a bewildering array of wire forms.

That's a good recommendation for any spring maker. Whatever your needs for Music Spring Wire or any other fine wire specialty, you can count on Johnson Steel & Wire Co. to give you the same consistent quality and good service which pleases Yost Superior.

You can get better wire and better products, starting today. Just call the nearest district sales office, listed here, and talk to a Johnson man who knows wire and production problems.

Grinding of spring ends on a Besly Grinder. These compression springs, made of .047 inch O.D. Johnson Music Spring Wire, are only 9/16 inch long and have an O.D. of 13/32 inch. On this machine, the closed ends are being ground square.

Coils of Johnson Music Spring Wire are delivered to the Coiling Department from Yost Superior's large stock room. The company normally carries an inventory of about 500 tons of wire.

Johnson Steel & Wire Company, Inc.

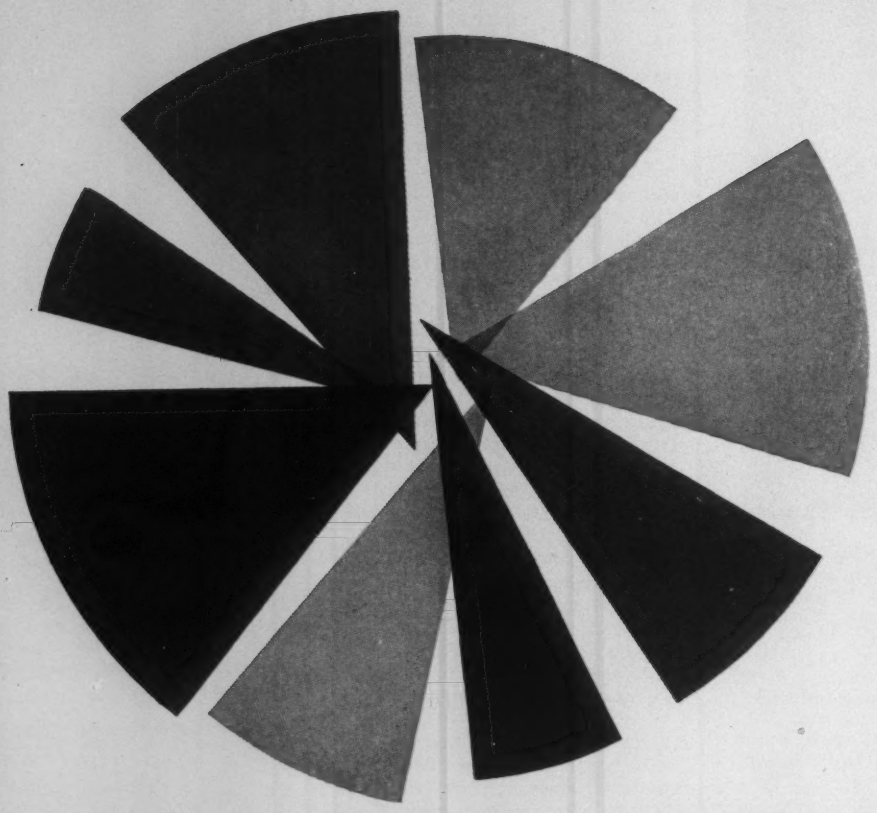
Worcester 1, Massachusetts

a subsidiary of **Pittsburgh Steel Company**

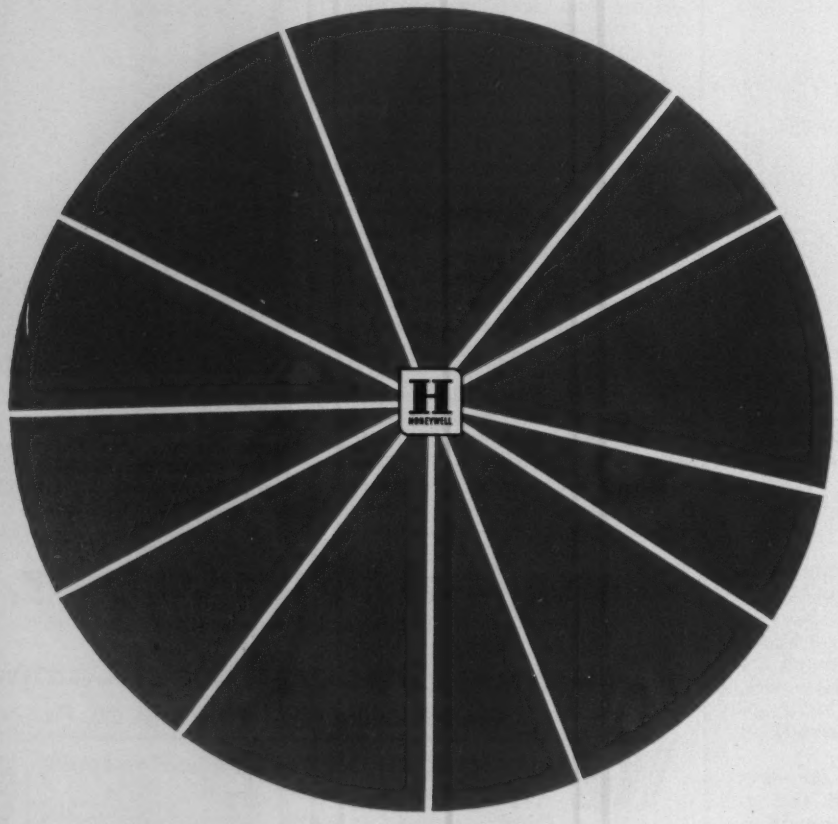
Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Akron	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio



YOUR PLANT'S CONTROL SYSTEM—HYBRID OR HONEYWELL?



The answer can be important to you. True, you can combine several makes of instruments into a system and get adequate results. But you usually pay a penalty for hybrid systems. There's the burden of responsibility for engineering and maintaining the system. There's the question of whether it will do what you want it to. There's the problem of modifying various makes of components to work together. And there's the inconvenience of buying instruments and spare parts from several suppliers instead of one.

Single-Source Responsibility. You avoid all of this with an all-Honeywell data processing or automatic control system. All components, from primary measuring elements to final controls, are supplied by Honeywell. If your requirements call for an analog or digital computer, Honeywell can supply it. From our systems engineers you get the advantage of experience gathered over 75 years of measurement and control work in scientific, military and industrial operations. And Honeywell takes full responsibility for the system, from initial planning through installation and startup, and even including maintenance.

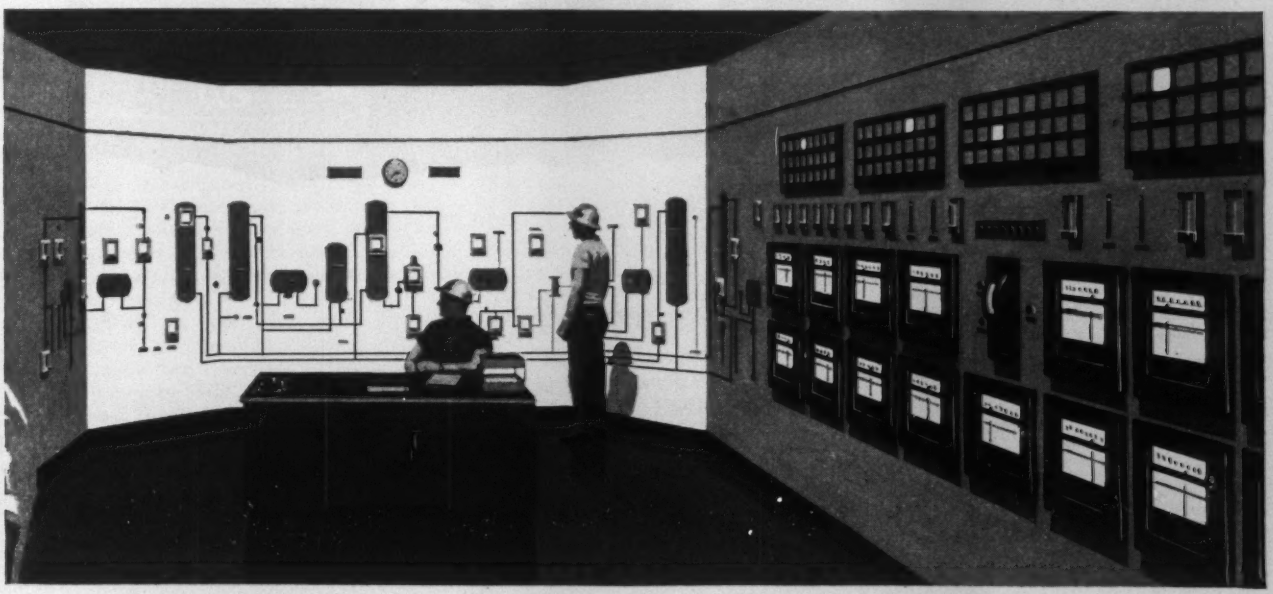
Conserve Your Working Capital. You can conserve working capital by leasing a Honeywell system from one to five years, paying for it as you use it. Because you lease at today's prices, you're protected against possible future price increases. Because you deal *only* with Honeywell, you needn't worry about long negotiations with third parties.

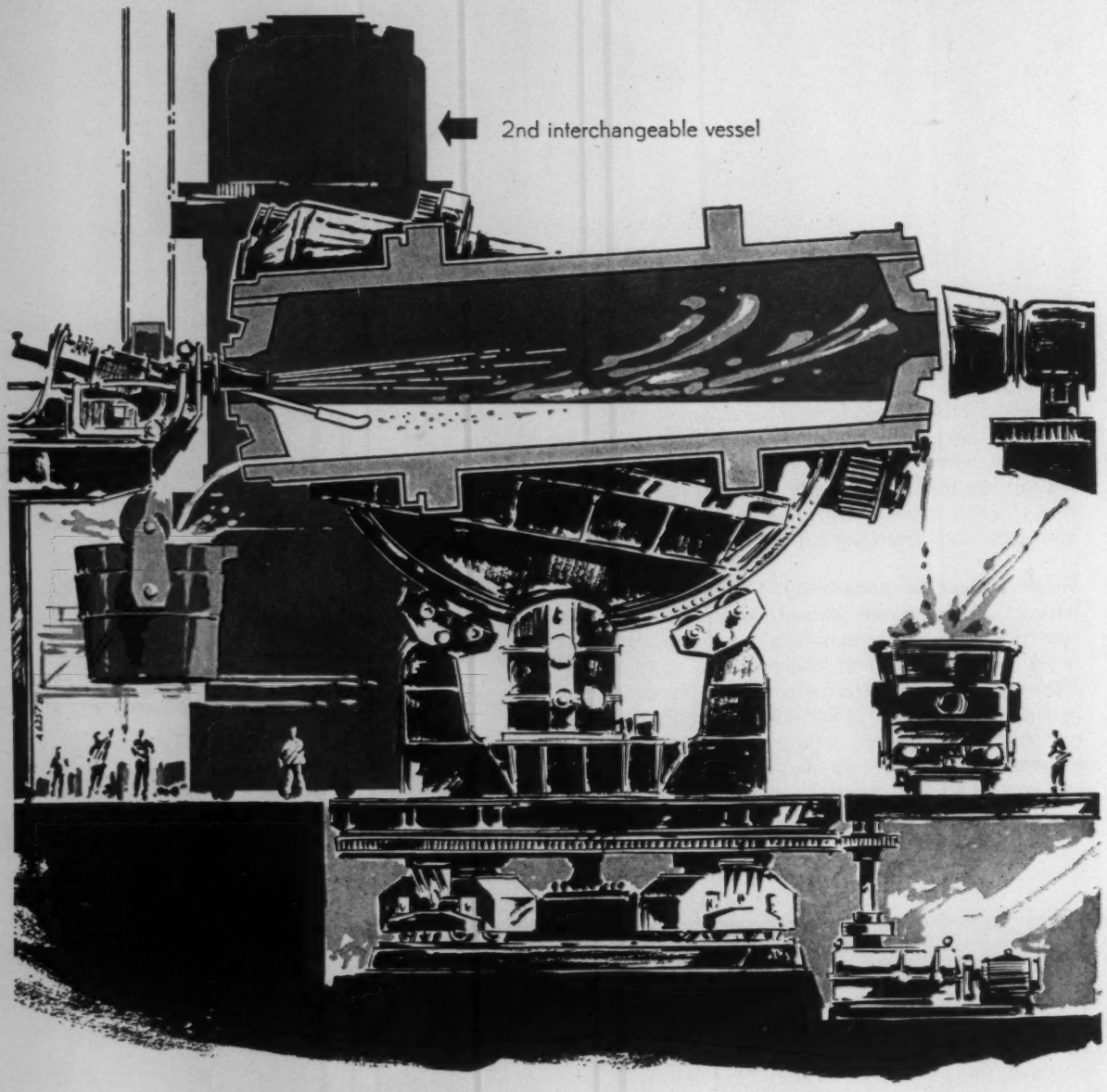
MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa. In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.

75th YEAR
PIONEERING THE FUTURE

Honeywell

First in Control
SINCE 1885





DEMAG

Cost-conscious Engineering

Among the latest methods of rational steel production is the Rotor Process in which hot metal is refined into steel of open-hearth quality with the help of oxygen. The furnace is mounted on a tilting cradle so that two interchangeable vessels can be employed. Production need thus not be interrupted when relining is necessary. DEMAG has designed and constructed to its own system plants of 75 to 100 ton capacity for European and overseas customers.

DEMAG AKTIENGESELLSCHAFT DUISBURG GERMANY

US-Representatives: American DEMAG Corporation, One Gateway Center, Pittsburgh 22, Pa

When Bell & Howell switched to Nialk Trichlorethylene with psp—permanent staying power, it extended clean-outs to a full three months.

How Bell & Howell degreases 390,000 lbs. of metal parts between bath clean-outs

When Bell & Howell switched to a Nialk® Trichlorethylene bath recently, it was found that bath clean-outs could be extended to a full three months.

Previously the bath had to be cleaned *every ten days.*

With the new Nialk bath, Bell & Howell is degreasing 195 tons of small camera and projector parts between clean-outs. The parts are aluminum, brass, steel and zinc and can all be cleaned in the same bath.

The secret is in the stabilizer
The only thing different about the Bell & Howell bath is the Nialk stabilizer. Light, heat, air and acids have no effect on the bath. Even aluminum fines, which can sour trichlor fast, have no effect in the presence of the Nialk stabilizer.

This stabilizer is not extracted by water either; hence all of it is reclaimed during distillation and steam injection. So permanent is the stabilizer that the bath stays fresh and fully protected at all times.

Bell & Howell simply adds more trichlor as drag-out losses lower the bath level; they never have to replenish the stabilizer itself.

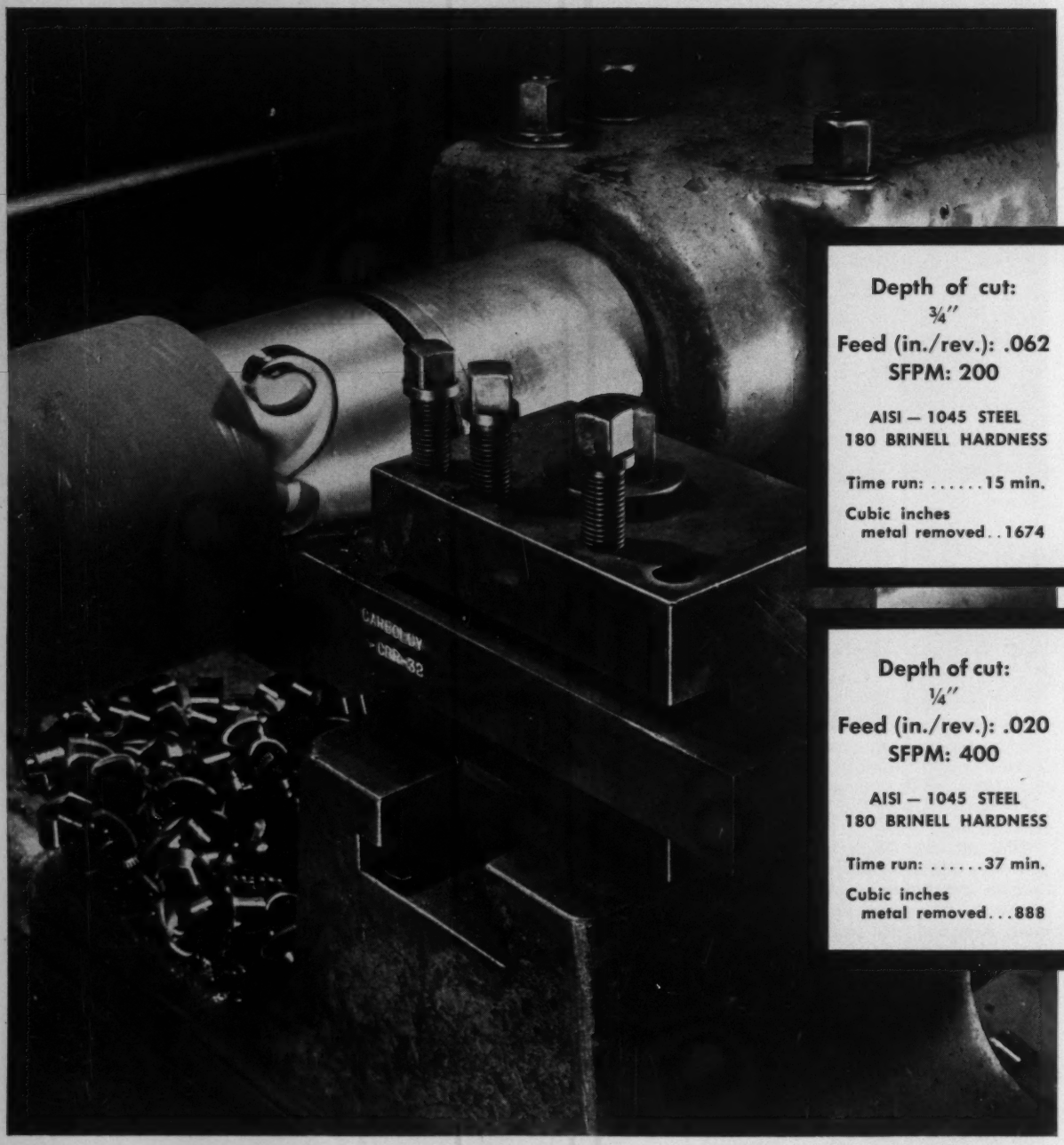
FREE BULLETIN • The whole question of stabilizers is so important to anyone concerned with vapor degreasing, we've written a bulletin specifically on the Nialk stabilizer and its advantages. Write for Bulletin 70 if you'd like a copy.

HOOKER CHEMICAL CORPORATION
312 Union Street, Niagara Falls, N. Y.

HOOKER CHEMICALS PLASTICS

Sales Offices: Chicago, Ill.; Los Angeles, Calif.; New York, N. Y.; Niagara Falls, N. Y.; Philadelphia, Pa.; Tacoma, Wash.; Worcester, Mass. *In Canada:* Hooker Chemicals Limited, North Vancouver, B. C.

Why ?



Depth of cut:
¾"
Feed (in./rev.): .062
SFPM: 200

AISI — 1045 STEEL
180 BRINELL HARDNESS

Time run: .....15 min.

Cubic inches
metal removed..1674

Depth of cut:
¼"
Feed (in./rev.): .020
SFPM: 400

AISI — 1045 STEEL
180 BRINELL HARDNESS

Time run: .....37 min.

Cubic inches
metal removed...888

Why is one Carboloy carbide grade best for light-duty steel-cutting applications; another more suitable for heavy-duty jobs? And which should you use?

Carbide selection can be scientific (and *should* be!) if you are going to get optimum results from your steel-cutting operation.

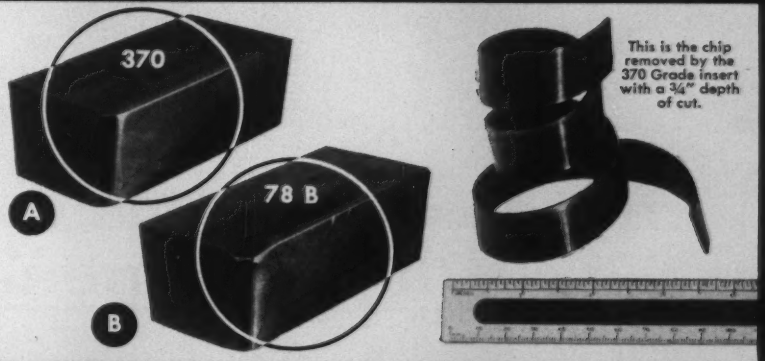
Take the job-graded Carboloy Grades 78B* and 370, for example. The 78B Grade is designed to offer real economy in normal steel-cutting applications—where machine power is limited. The 370 Grade, on the other hand, was developed specifically for heavy-duty steel-cutting jobs. Look over the following examples; then contact your Carboloy representative, or Authorized Carboloy Distributor, for information on Carboloy *job-graded* carbides for your specific operation. Take advantage of *better profits through better tooling.* Call today, or write: *Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Street, Detroit 32, Michigan.*

*Carbides in 78 Series are all pre-honed. Carbides in the 300 series are available pre-honed, precision-ground, or utility-ground.

HEAVY-DUTY MACHINING

Photograph A shows the Carboloy 370 Grade insert after the run. Wear land was only .012", and there is no deformation (upsetting) of the cutting edge. Photo B shows the 78B Grade insert after the same run. Note the deformation of the cutting edge . . . Grade 78B was not designed for such severe cutting pressures.

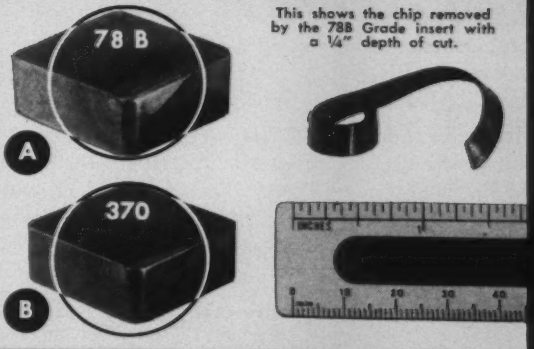
CONCLUSION: *In this heavy-duty application, Carboloy 370 Grade is recommended.*



LIGHT-DUTY MACHINING

In this light-roughing application there is little visible difference between the Carboloy 78B Grade insert (Photo A) and the 370 Grade insert (Photo B). Because 78B Grade is job-graded for light- and medium-roughing applications, it will wear as long as 370 Grade. Grade 78B insert is lower in initial cost, so in this case it makes good sense to use Grade 78B. In this example, the wear land on 78B insert was only .010".

CONCLUSION: *In this normal steel-cutting application, Carboloy 78B Grade is recommended.*



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CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT
GENERAL ELECTRIC

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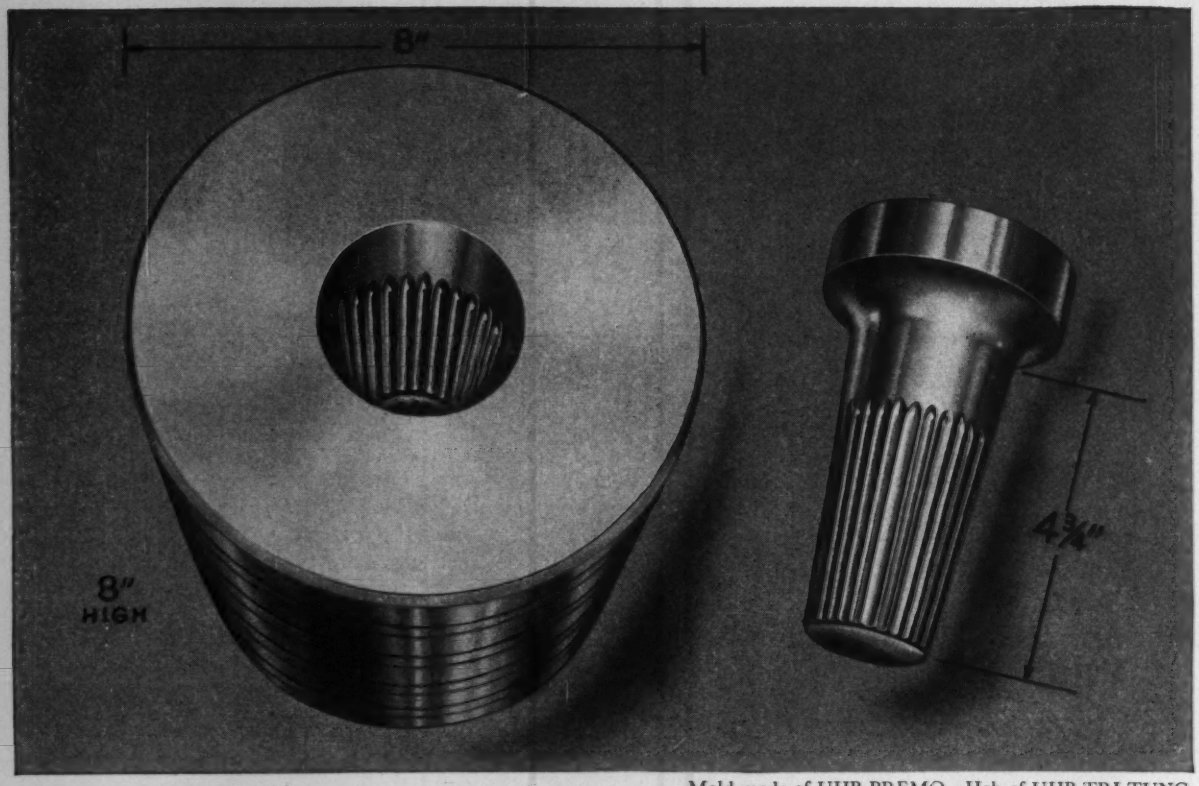

Mold made of UHB PREMO—Hob of UHB TRI-TUNG

This Plastic Mold Was Cold Hobbed Without Annealing!

This mold made from UHB PREMO, a 5% chrome-type plastic mold steel (SAE P4), is used for molding plastic containers (Polyvinyl Chloride).

Because UHB PREMO is extra low in carbon content, very soft in its annealed state, and has truly outstanding sinking properties, the hobbing of this mold was done in four stages with *no annealing between stages!*

When hardened and tempered, UHB PREMO has an excellent wear resistant case—a high core hardness, (Brinell 250-300 depending on size) which provides good resistance to sinking, and it also polishes to a mirror-like finish with a minimum of effort. The mold blank was approximately 8" high by 8" diameter—the cavity is 4-11/32" deep. Hobbing was done with ram speeds of 0.05" to 0.06" per minute.

This mold was cold hobbed with a hob made of UHB TRI-TUNG, a high-carbon, high-chrome steel (SAE D6). The hob was copper plated between stages and lubricated with "Molykote".

There are more than 2800 different types, grades and sizes of Uddeholm Tool Steels available from warehouse stocks, which will give equally good results for their recommended applications.

Write today for your UHB PREMO Booklet with Stock Sizes!

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TOOL AND DIE STEELS
COLD ROLLED SPRING STEELS

UDDEHOLM COMPANY OF AMERICA, INC.

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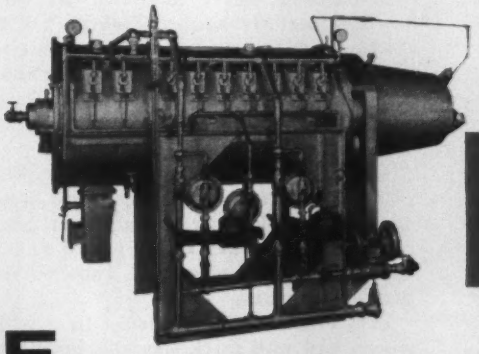
AGF

AMERICAN GAS FURNACE CO. 82 YEARS OF PIONEERING 1878 1960 ELIZABETH, N. J.

ROTARY RETORT AND RECIPROCATING HEARTH

for all small parts heat treating



AGF

Model 236-660

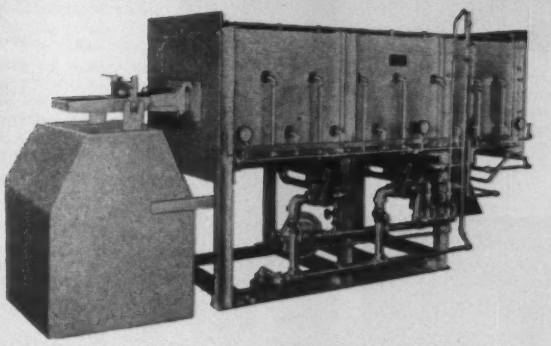
Medium size rotary furnace for the most economical heat treating of parts that can be subjected to a gentle tumbling (approximately ¼ r.p.m.).

Tumbling insures uniform heating and atmosphere contact.

AGF

Model 231

Medium size Shaker Hearth Furnace for the widest range of work, even light and delicate stampings. Momentum imparted to each work piece conveys it individually through the heat with no distortion or warpage.



Capacities to 800 lbs. per hour. Processing pieces from .010" to 1" thickness and up to 10" in length. Automatic continuous feeding reduces direct labor costs drastically! Clean hardening, ammonia-gas case hardening, light case carburizing of steel parts, etc., are accomplished equally well WITHOUT ANY MODIFICATION OF THE FURNACE.

The muffles and retorts are, in reality, radiant tubes WITHIN which the work and atmosphere gas is contained. Zoned combustion systems uniformly heat these muffle tubes from the outside to the desired temperature in each work zone. Control is precise, results uniform.

New catalog of entire AGF line of equipment and accessories now available . . . Write for your copy today.

AMERICAN GAS FURNACE CO.

AMERICAN GAS FURNACE CO. PIONEERS 1878

1004 LAFAYETTE STREET — ELIZABETH 4, N. J.

another tough problem solved with...

REPUBLIC ELECTRUNITE MECHANICAL TUBING

Republic's tube making know-how and fabricating facilities combined to solve a tough problem for the Kuhlman Electric Company, Birmingham, Michigan.

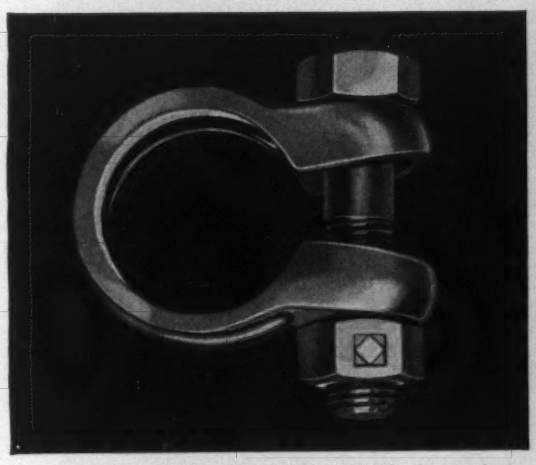
Kuhlman engineers wanted a material to meet the designs of the new Kuhlman "Quick-Grip" H.V. transformer bushing that would reduce radio noise without oil. They preferred the part supplied as a finished product.

A bushing sleeve made of Republic ELECTRUNITE Carbon Steel Mechanical Tubing, 2⅜" O.D., 10-gage, was the answer. The sleeve is approximately 3" long and has a chamfer on one end. Holes are punched on circumference, and the other end of the tubing is expanded. Coarse threads are cut in the expanded metal on an automatic screw machine.

This is a typical example of the flexibilities in fabrication of ELECTRUNITE. And Republic's Steel and Tubes Division has the facilities, equipment, and "know-how" to fabricate all grades and types of ELECTRUNITE carbon and stainless steel tubing into whatever shapes your product requires.

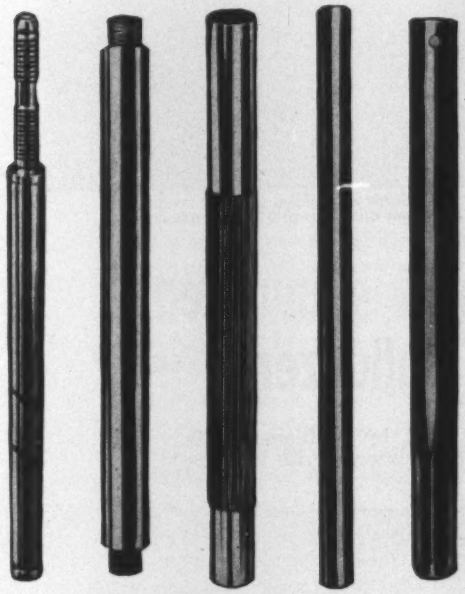
ELECTRUNITE is available in a wide range of sizes, gages, and wall thicknesses in both carbon and stainless steel. Call your Republic representative. Or, write direct. Use coupon below.

The Kuhlman "Quick Grip" H.V. sleeve, made of Republic ELECTRUNITE Mechanical Tubing, is a feature of the K-E Kuhlman Transformer, engineered and manufactured by the Kuhlman Electric Company, Birmingham, Michigan.



REPUBLIC NYLOK NUTS proved to be the solution for fast production and plus-safety features in the manufacture of an automobile steering mechanism, shown above. NYLOK nuts are ideal for automatic feeding, and give permanent, vibration-proof lock. Easy adjustment and re-use assured by permanent resiliency of the nylon pellet. Can be easily backed-off for parts inspection and adjustment. Write for data.

REPUBLIC ELECTRUNITE STAINLESS STEEL TUBING, Type 304, 4½″ O.D., was used to fabricate corona rings for a powerful East Coast Navy Radio Station. Despite the rather severe bend of the 15- and 20-foot rings, the fabricator reported no trouble whatsoever. The rings were made in three sections. ELECTRUNITE was bent to the correct radius. Three lugs were welded to each section. The ends were flared for the insertion of a plug used at the erection site to assemble the unit and suspend it from towers. ELECTRUNITE Stainless Steel Tubing and Pipe are available in most A.I.S.I. analyses from ⅜″ O.D. to 5″ O.D. Send for data.



REPUBLIC CENTURY SERIES of high strength, stress-relieved, cold finished steel bars meet the needs of steel parts producers requiring high strength with varying degrees of machinability. Available in five grades—C-1144, C-1141, C-1151, C-1050, C-1045—with each grade having a minimum yield strength of 100,000 psi. The CENTURY SERIES assures dimensional stability with excellent machinability, provides high mechanical properties in a range of chemistries. Send for booklet.

Strong, Modern, Dependable

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. IA-9781-D
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send more information on the following products:

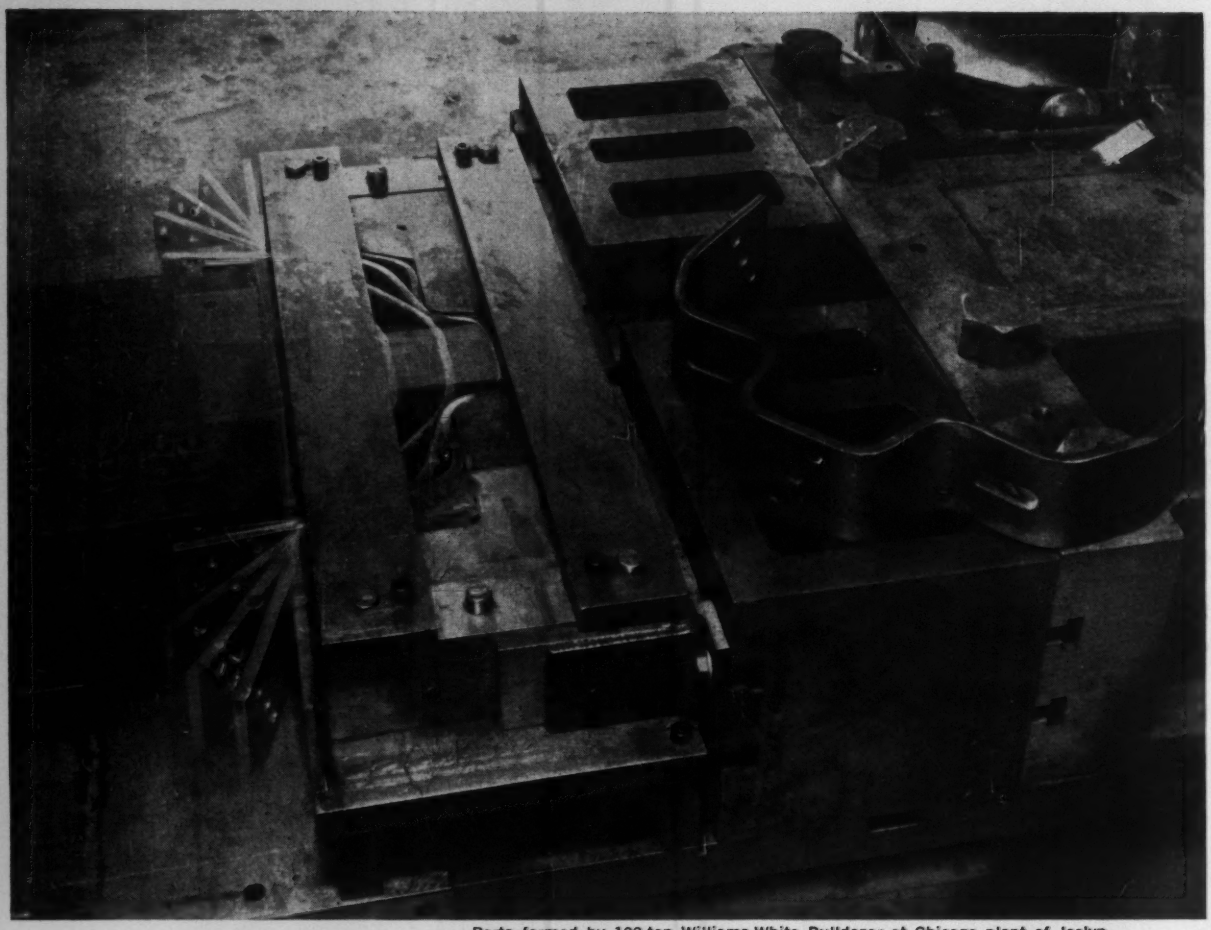
- ☐ Republic ELECTRUNITE® Mechanical Tubing
- ☐ Republic ELECTRUNITE Stainless Steel Mechanical Tubing
- ☐ Republic CENTURY SERIES Cold Finished Steel Bars
- ☐ NYLOK® Bolt and Nut Fasteners

Name_____ Title_____

Firm_____

Address_____

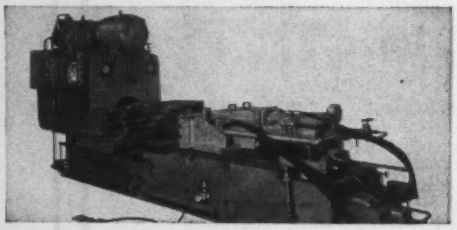
City_____ Zone____ State_____



Parts formed by 100-ton Williams-White Bulldozer at Chicago plant of Joslyn Manufacturing and Supply Company. Holes are drilled in previous operation.

150% production boost -- 2 steps eliminated with Williams-White hydraulic Bulldozer

The job: Form a hot rolled steel workpiece, ½" x 4" x 42", in one operation. Previously, this tough assignment took 3 strokes of a press. Production rate was 40 parts per hour. NOW — a 100-ton Williams-White Bulldozer with hydraulic cushion, utilizing special tooling by Joslyn engineers, forms the hot steel in one squeeze. Current production rate: 100 parts per hour. The production increase and elimination of 2 steps in this application are typical of results gained with Williams-White heavy machinery and skillful tooling. Check into the time and money-saving advantages of metal forming equipment built by Williams-White, originator of the bulldozer. Write for illustrated Bulletin #73.



107th year

WILLIAMS-WHITE & CO 600 Third Avenue, Moline, Ill.

the measure of Performance Reliability for more than a century

BULLDOZERS • PRESSES • SHEARS • BENDERS • PUNCHES • HAMMERS

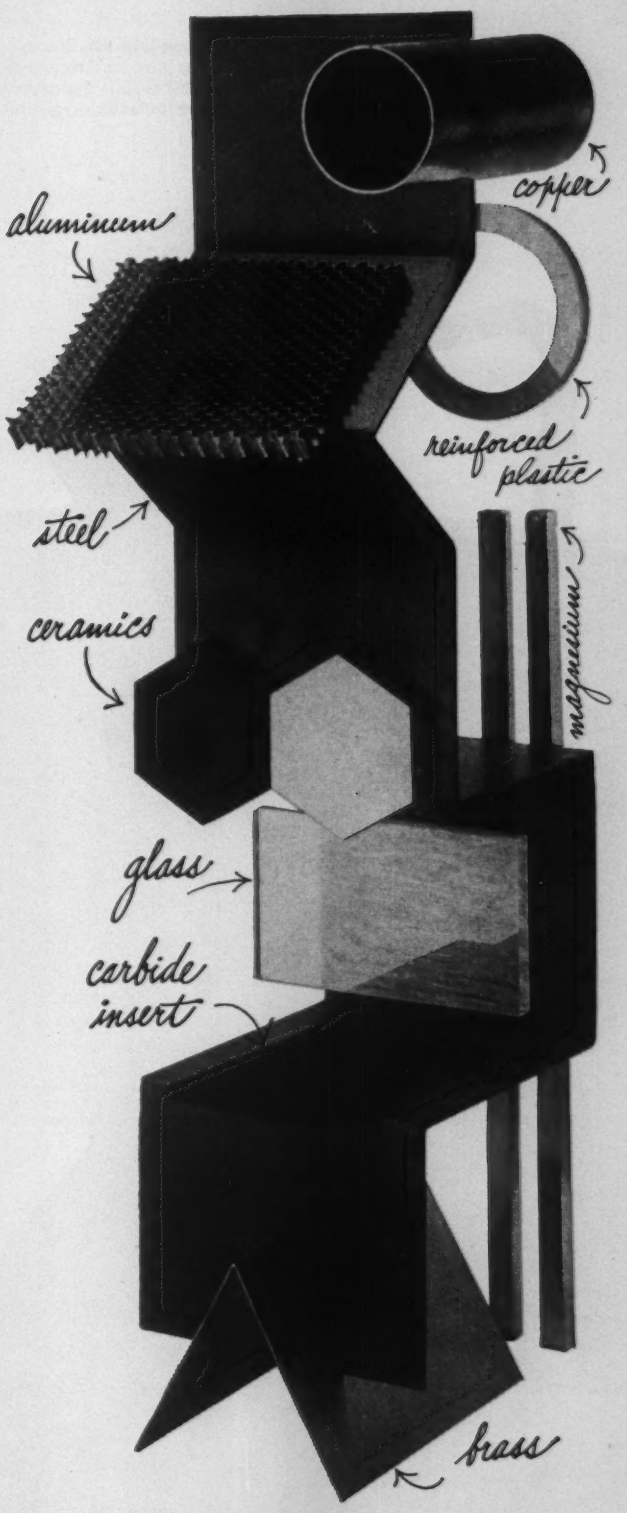
WHAT DO YOU WANT TO BOND TO WHAT?

Take a structural material—for instance, any of the materials shown to the right. Want to join it to itself or another material? Then chances are that SCOTCH-WELD® Brand Structural Adhesives are your best fabricating answer. This modern high strength method of joining materials permits improved design and production techniques . . . cuts costs . . . offers unique benefits.

For example: Smoother contours result when mechanical fasteners are eliminated. Fabricating complex shapes—often impossible or too expensive with ordinary fastenings—is made easy and economical with SCOTCH-WELD Adhesives. In fact, costly complex castings can often be replaced by two or more inexpensive simple castings bonded together with SCOTCH-WELD Adhesives. And lighter gage materials may be used where desired, since stress is spread over a wide area. Often, too, inspection and production steps can be eliminated. Another benefit—unusual combinations of materials which can be joined in no other way can be bonded perfectly with SCOTCH-WELD Adhesives.

Throughout the metalworking industry, bonding with SCOTCH-WELD Brand Structural Adhesives is improving quality, speeding production and cutting costs.

SCOTCH-WELD Adhesives may be the answer to your design and production problems . . . and improve your product at the same time. For full information write on your company letterhead, outlining area of interest, to: AC&S Division, 3M Company, Dept. SBQ-120, St. Paul 6, Minn. "SCOTCH-WELD" is a Reg. T.M. of 3M Co.

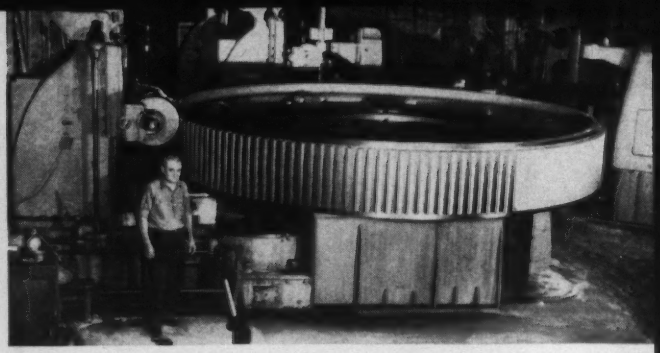


ADHESIVES, COATINGS AND SEALERS DIVISION

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY



Big gear hobbing jobs like this one are everyday jobs for Chicago Gear. STANICUT Oil 208 BCS is the cutting oil used in all gear manufacturing machines.

Chicago Gear Mfg. Company tames tough steels, cuts costs with STANICUT Oil 208 BCS

Tames tough steels. Gears from one to 300 inches in diameter are machined by Chicago Gear. Steels up to 375 Brinell hardness are worked. STANICUT Oil 208 BCS helps them do it. STANICUT 208 contains maximum amounts of sulfur, chlorine and compounding to make it suitable for handling tough alloy steels. It is viscous enough to stay on big tools and work pieces, yet fluid enough to flow over the work in sufficient volume to assure good cooling.

Cuts costs. STANICUT Oil 208 BCS is used at Chicago Gear for all gear hobbing operations and for all other applications requiring a straight cutting fluid. There's no chance of the wrong fluid being used, thus no costly losses. One fluid cuts down inventory, saves time in keeping track of stocks, cuts paper work handling and ordering.

Gets service. Standard Oil's Dick Erickson is assigned to the Chicago Gear account. Dick has a degree in mechanical engineering from Purdue plus several years' experience providing customers with technical help on lubrication. With this experience and training, Dick knows how to help a customer, knows how to supply technical help where it counts. Could STANICUT Oil 208 BCS and Standard Oil technical service help you? Ask about them at the Standard Oil office near you anywhere in the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue. Chicago 80. Illinois.**

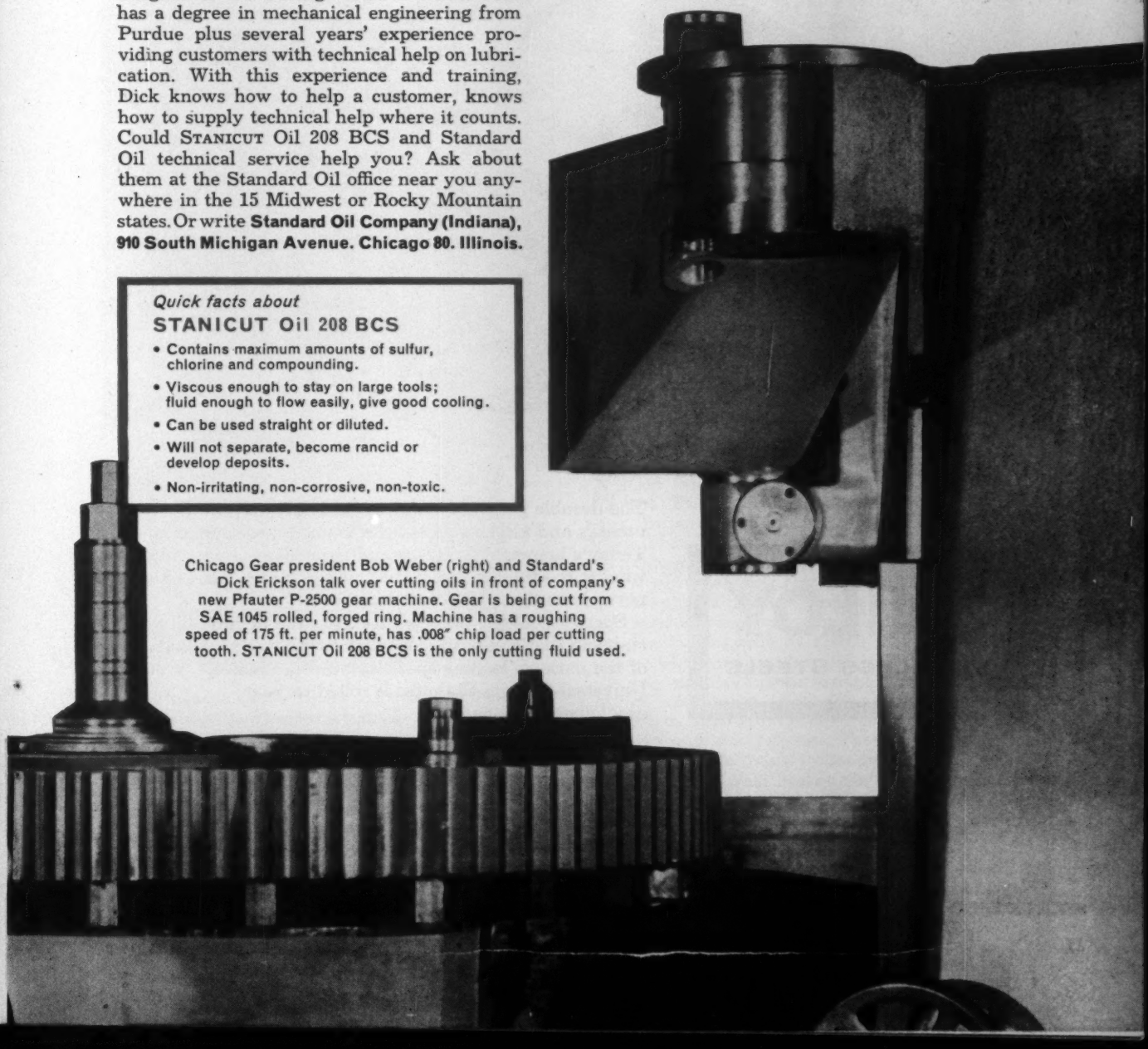
Quick facts about

STANICUT Oil 208 BCS

- Contains maximum amounts of sulfur, chlorine and compounding.
- Viscous enough to stay on large tools; fluid enough to flow easily, give good cooling.
- Can be used straight or diluted.
- Will not separate, become rancid or develop deposits.
- Non-irritating, non-corrosive, non-toxic.

STANDARD

You expect more from Standard and you get it!



Chicago Gear president Bob Weber (right) and Standard's Dick Erickson talk over cutting oils in front of company's new Pfauter P-2500 gear machine. Gear is being cut from SAE 1045 rolled, forged ring. Machine has a roughing speed of 175 ft. per minute, has .008" chip load per cutting tooth. STANICUT Oil 208 BCS is the only cutting fluid used.

UNILOY
STAINLESS STEELS

The durable gleam of stainless steel flatware, utensils and kitchen accessories is mighty welcome. Today's homemaker knows and appreciates stainless for what it is—the *one* metal that always cleans fast and easy, never loses that *just-bought* beauty.

Specify Uniloy Stainless Steel. It's the high quality stainless that's easy to work and form. Made by one of the nation's leading specialty steel producers, Universal-Cyclops Stainless is rolled to your exact specifications.

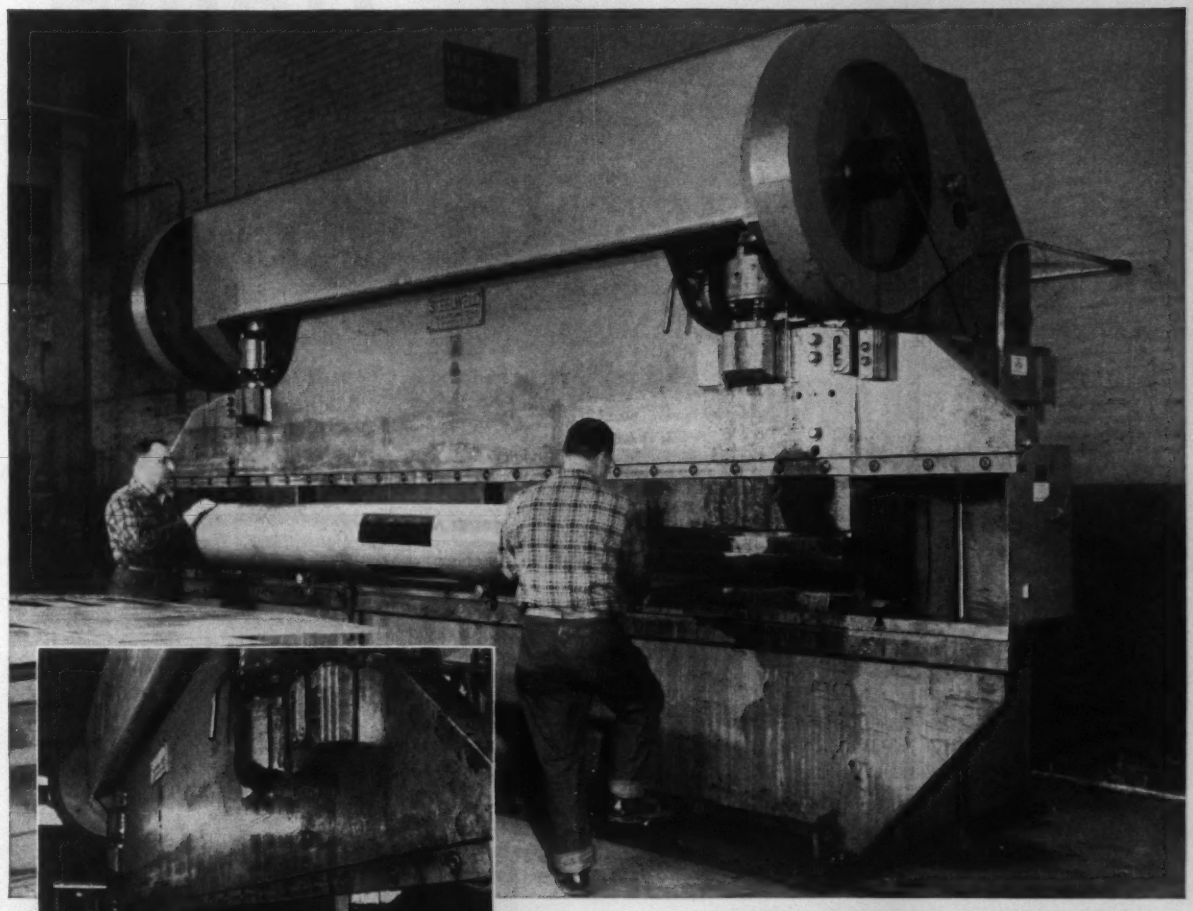
UNIVERSAL CYCLOPS
UC STEEL
STEEL CORPORATION
EXECUTIVE OFFICES: BRIDGEVILLE, PA.

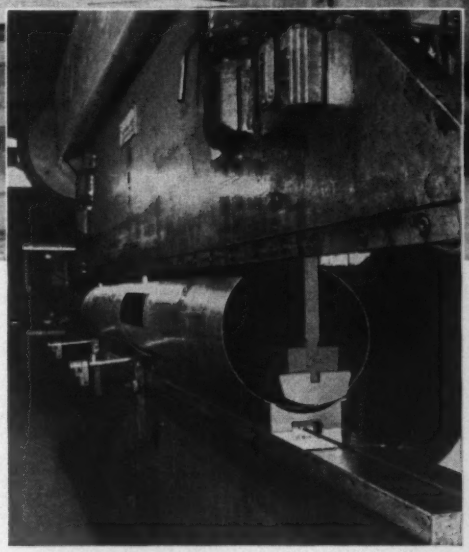
STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS

COMBINE AUGER TUBES

25 to 50 Made Per Hour at Massey-Ferguson, Ltd.

Steelweld Brake in service since 1950. Bed and ram are 18'-0" long including 2'-0" extensions at both ends. Bending capacity rated at 12' x 3/16".





Flat metal is quickly formed into a cylinder by a series of pressure contacts with this die arrangement.

AUGER tubes for combines made at Massey-Ferguson, Ltd., Toronto, are produced at rates of 25 to 50 per hour, depending upon conditions, with a Steelweld Brake. The tubes are from 10 to 16 feet long and made of 16 gauge steel.

This job represents one of a multitude performed at low cost on this brake, which is used for many bending and metal-forming operations required for the various farm implements built by Massey-Ferguson.

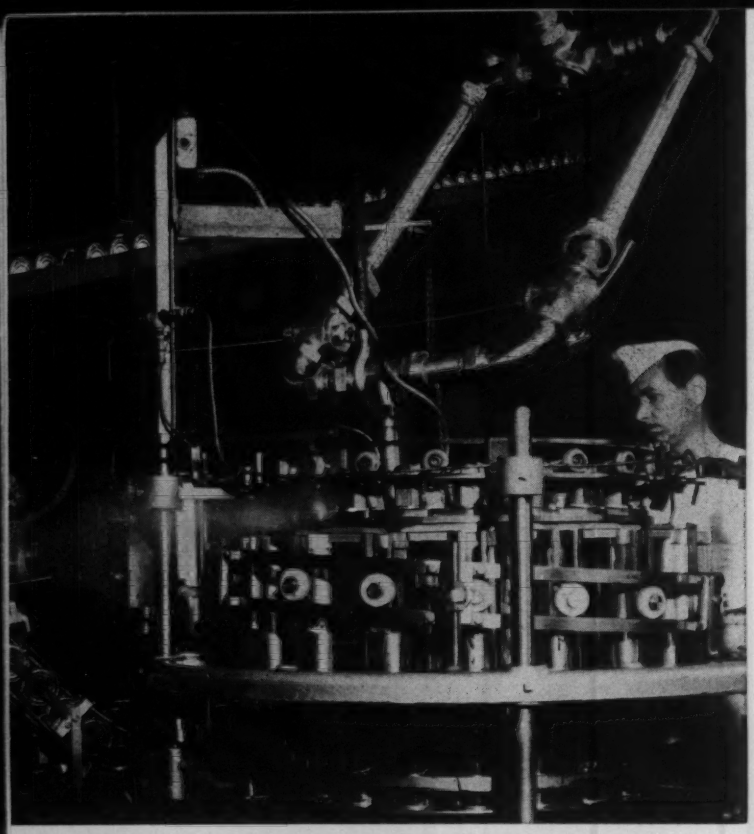
Steelwelds are popular with farm machinery manufacturers and have been serving many for years. They perform accurately, keep going continuously on long production runs without need of frequent adjustments, tinkering and maintenance. They are easy and safe to operate. Dies are quickly changed.

Because Steelweld Brakes are heavily built machines loaded with features that will help you, it will be to your interest to give them serious consideration when additional brakes are needed.

STEELWELD
PRESS BRAKES

Write for free copy of Catalog No. 2010
Gives construction and engineering details

STEELWELD DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4868 E. 281 ST. • WICKLIFFE, OHIO



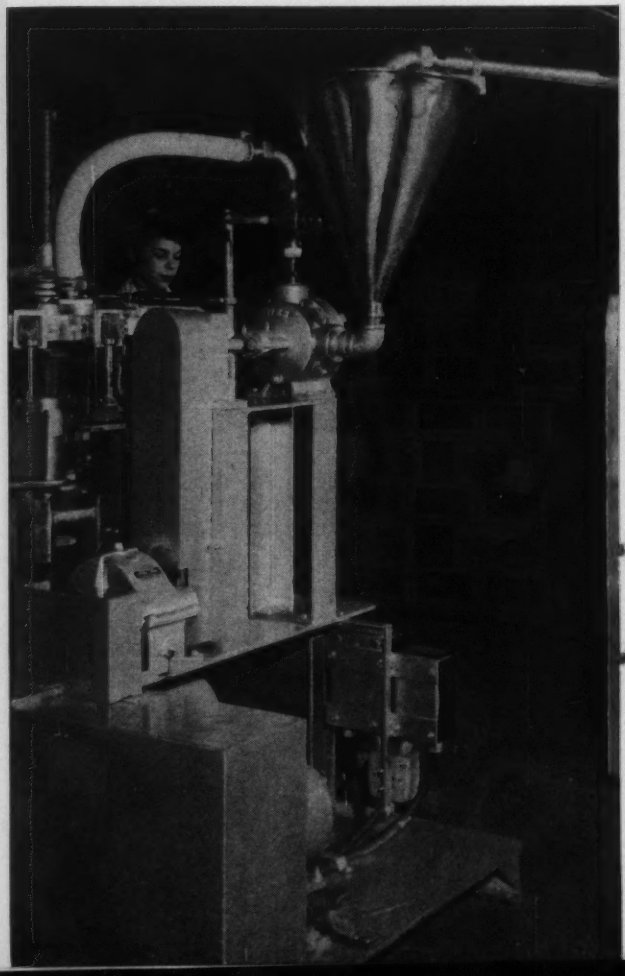
...LIQUID

If you make equipment that fills cans with chocolate or consomme, prune juice or pop, equipment made of Stainless Steel will do it fast, dependably, cleanly. The Votator* piston filler shown here happens to be filling cans with chocolate. Made of Stainless Steel, this filler can't harbor germs because Stainless Steel has a smooth, pocket-free surface. It is easily cleaned, too, so the strict standards of cleanliness that are mandatory in any food processing plant are easily maintained. Stainless Steel's resistance to corrosion makes it ideal for liquid applications.

**VOTATOR is a registered trademark of the Chemetron Corporation.*

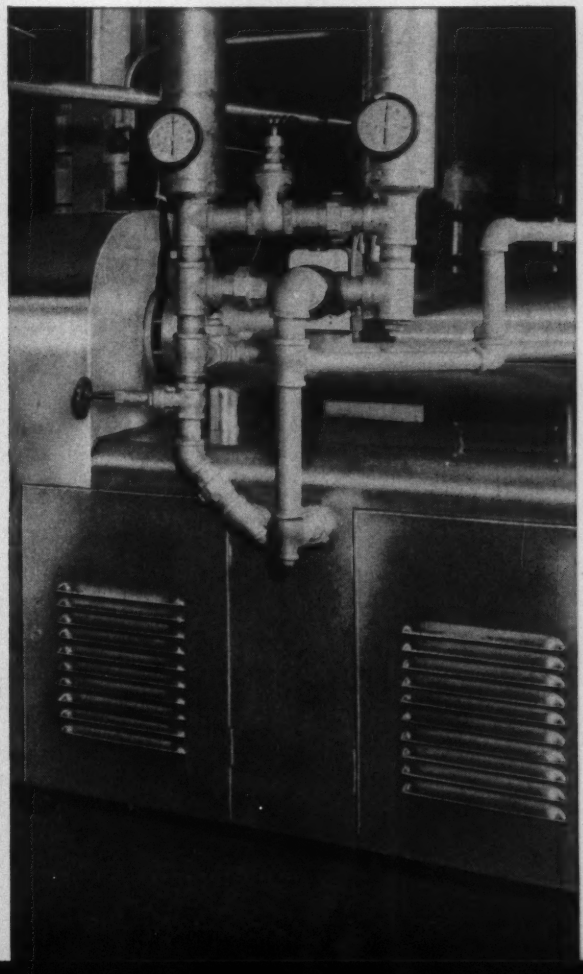
SOLID...

If you make equipment that processes solids like peanut butter or shortening, Stainless Steel can make your job easier and more profitable. This system makes peanut butter . . . and it makes it creamier. It takes whole peanuts in one end and grinds them, then Votator equipment heats them, cools them and turns out the finished product, ready for sandwich or cracker, at the other end. Here, Stainless Steel is used in the heads and shaft of the heat transfer area to assure maximum cleanliness. In a sealed unit like this one, corrosion could be a problem so Stainless Steel's inherent corrosion resistance is put to good advantage.



USS Stainless Steel . . . no other metal makes such a material difference in so many applications

This mark tells you a product is made of modern, dependable Steel.



...and in between

No material can match Stainless Steel's versatility. Stainless Steel offers designers and fabricators a unique combination of properties: superior strength, extraordinary corrosion resistance to an enormous variety of materials, outstanding properties at high temperatures, and attractive appearance. It is easily fabricated, and because Stainless Steel lasts longer, actually costs less in the long run.

For unmatched efficiency, durability, ultimate economy, specify Stainless Steels . . . no other metal makes such a material difference in so many applications.

If you have a selection or delivery problem, ask your USS representative or nearest Steel Service Center.

USS is a registered trademark

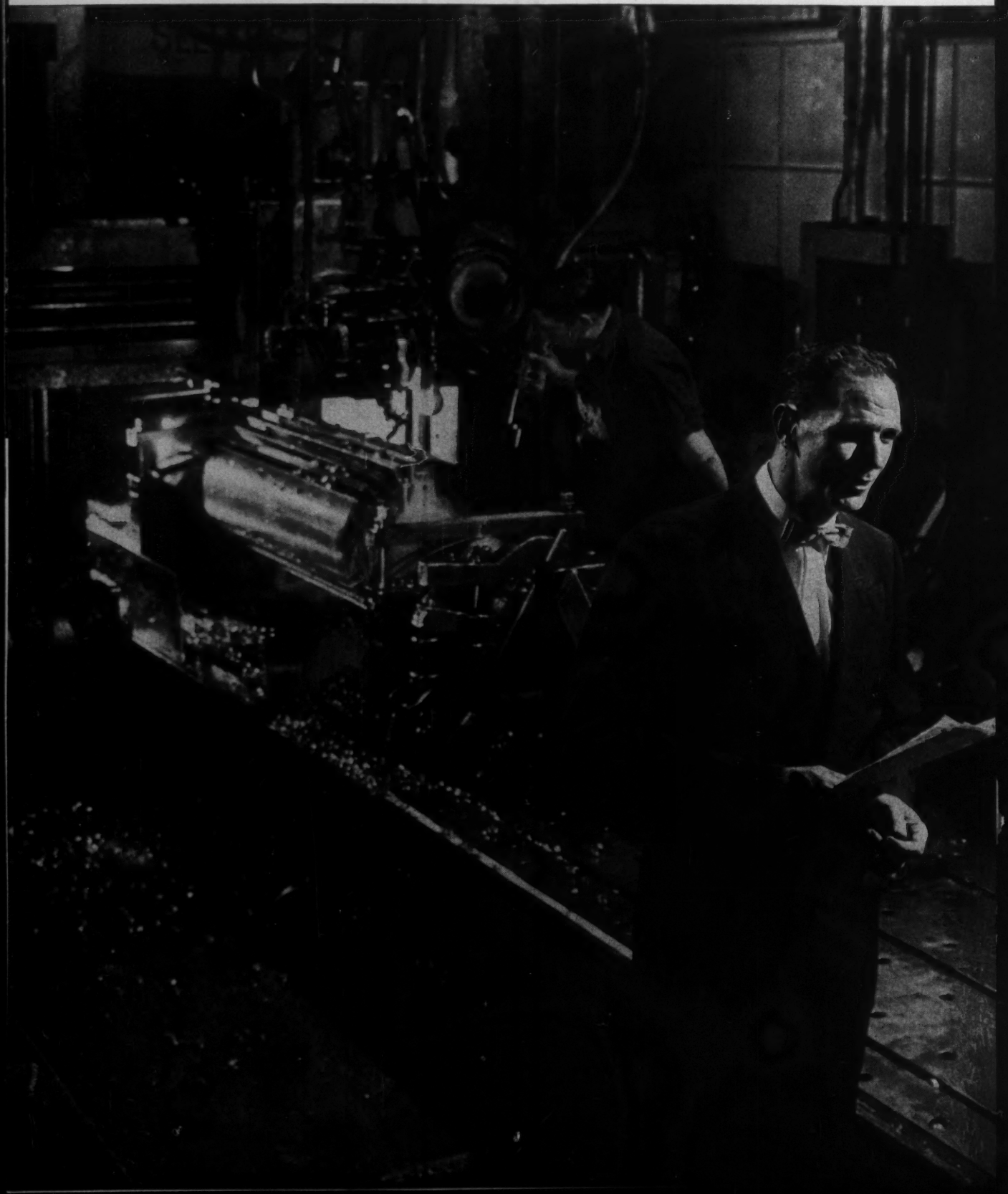
USS

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

Watch United States Steel's special Christmas show, **The Coming of Christ**, in Color on NBC-TV, Wednesday, December 21, 8:30 P.M., E.S.T.

THE MAN & THE DRIVES



FROM WESTINGHOUSE

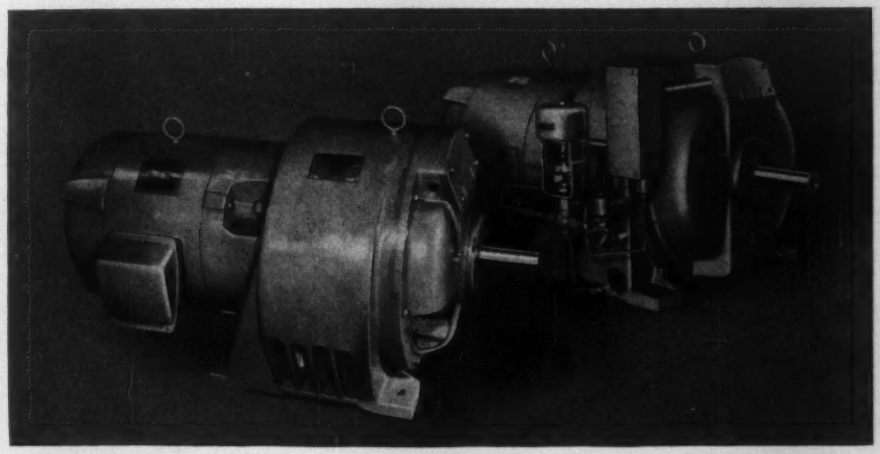
Mr. Westinghouse and MagnaFlow Drives Bring Simple Solution to Speed Control Problems, Save Money and Space, Too!

Westinghouse MagnaFlow* electromagnetic drives—air or liquid cooled—provide infinitely adjustable speeds from standstill to top speed with regulation guaranteed at $\pm 2\%$ of top speed over a 17-to-1 speed range (even closer regulation when desired). Control is smooth and stepless.

These compact drives, having a minimum number of parts, are built for rough, trouble-free service. The unique electromagnetic coupling maintains adjustable output speed without the use of pulleys, belts, brushes, commutators, slip rings or rotating windings. A rugged Life-Line® "A" motor supplies reliable a-c drive power. No power converting equipment needed—only a small, static exciter and an operator's control station. Initial cost is low; installation—easy and inexpensive.

Your Man from Westinghouse is ready now to help you apply MagnaFlow drives . . . and any other drives you may need. Call him . . . or write for a copy of Westinghouse MagnaFlow Electromagnetic Drives (B-7875), Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. You can be sure . . . if it's Westinghouse. J-22162

*Trade-Mark



MagnaFlow drives—air cooled (foreground) and liquid cooled—are available in various horsepower ratings for winders, conveyors, fans, pumps, extruders and other machinery in all industries.

Westinghouse

MEET THE NEWEST MEMBER OF A FAMOUS STEEL FAMILY...

USS "T-1" TYPE A STEEL

Since its introduction in 1953, USS "T-1" Steel has become one of the world's best known steels. Its extraordinary strength, toughness, weldability and resistance to impact abrasion have increased service life of equipment as much as ten times. No other steel has equaled "T-1" Steel's record of success.

The new USS "T-1" Type A Steel is the first addition to this family of constructional alloy steels. It is a quenched and tempered constructional alloy steel produced in thicknesses through 1" maximum with the same tremendous strength, weldability and resistance to impact abrasion as "T-1" Steel. However, through the development of a new analysis, "T-1" Type A Steel is a *more economical* steel for many applications.

USS "T-1" Type A Steel was developed through U. S. Steel's continuous research efforts to produce new and better products at the lowest possible cost. It is available in bars and semi-finished form and in plates from 3/16" through 1" thick inclusive, and in the full range of plate widths and lengths now available in USS "T-1" Steel. If extra hardness is needed, USS "T-1" Type A Steel can be furnished to a minimum Brinell hardness of 321.

For your copy of a properties card on USS "T-1" Type A Steel, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS and "T-1" are registered trademarks

SUGGESTED APPLICATIONS: Earthmoving and mining equipment, building construction, bridges, truck frames and bodies, missile transporters and launchers, oil field rigs and machinery transporters—wherever great strength, weldability, toughness, and resistance to impact abrasion are needed to build equipment stronger, lighter and more durable.

USS "T-1" Type A Steel Mechanical Properties and Chemistry

1. Produced in gages up to 1", inclusive.
2. Sold to the following chemistry: †

C	.12/.21	Cr	.40/.65
Mn	.70/1.00	Mo	.15/.25
P	.040 Max.*	V	.03/.08
S	.050 Max.*	B	.0005/.005
Si	.20/.35	Ti	.01/.03

3. Quenched and Tempered to meet the following mechanical properties:

	3/16" to ¾" incl.	Over ¾" to 1" incl.
Min. Yield Strength	100,000 psi	100,000 psi
Tensile Strength	115,000/135,000	115,000/135,000 psi
Elongation in 2"	18% min.	16% min.
Reduction of Area	40% min.	50% min.

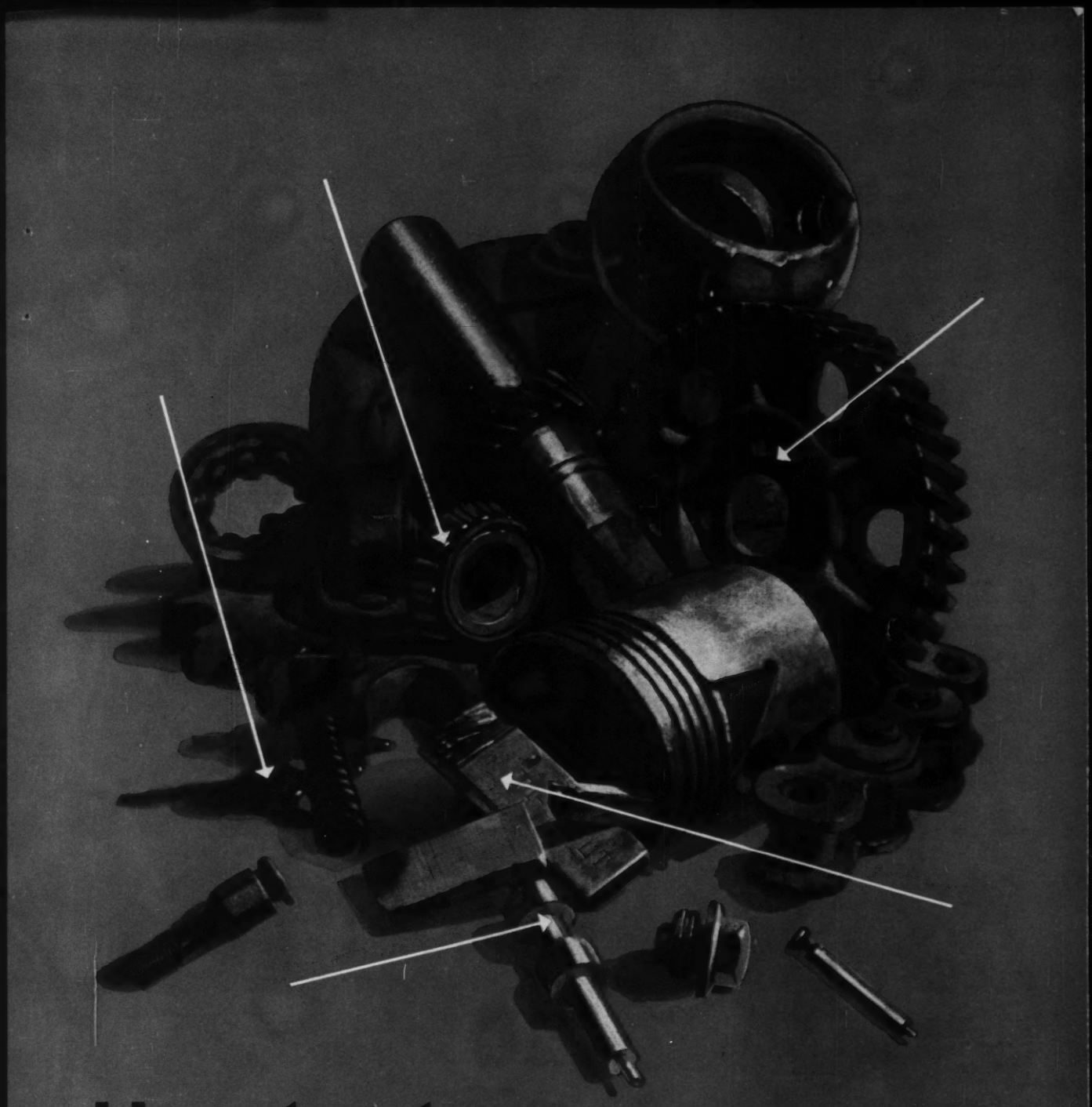
4. Charpy impact values**
   15-foot-pounds at minus 50°F. based on longitudinal keyhole test.
5. This steel can also be produced to a min. BHN of 321, and when so produced, all other mechanical properties are waived.
6. Atmospheric corrosion resistance—at least two times that of structural carbon steel.

*When ordered to FBQ (Fire Box Quality) max. P is .035 and max. S is .040.
**Applies only to FBQ
†U. S. Patent No. 2858206

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
National Tube—Pittsburgh
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

This mark tells you a product is made of modern, dependable Steel.



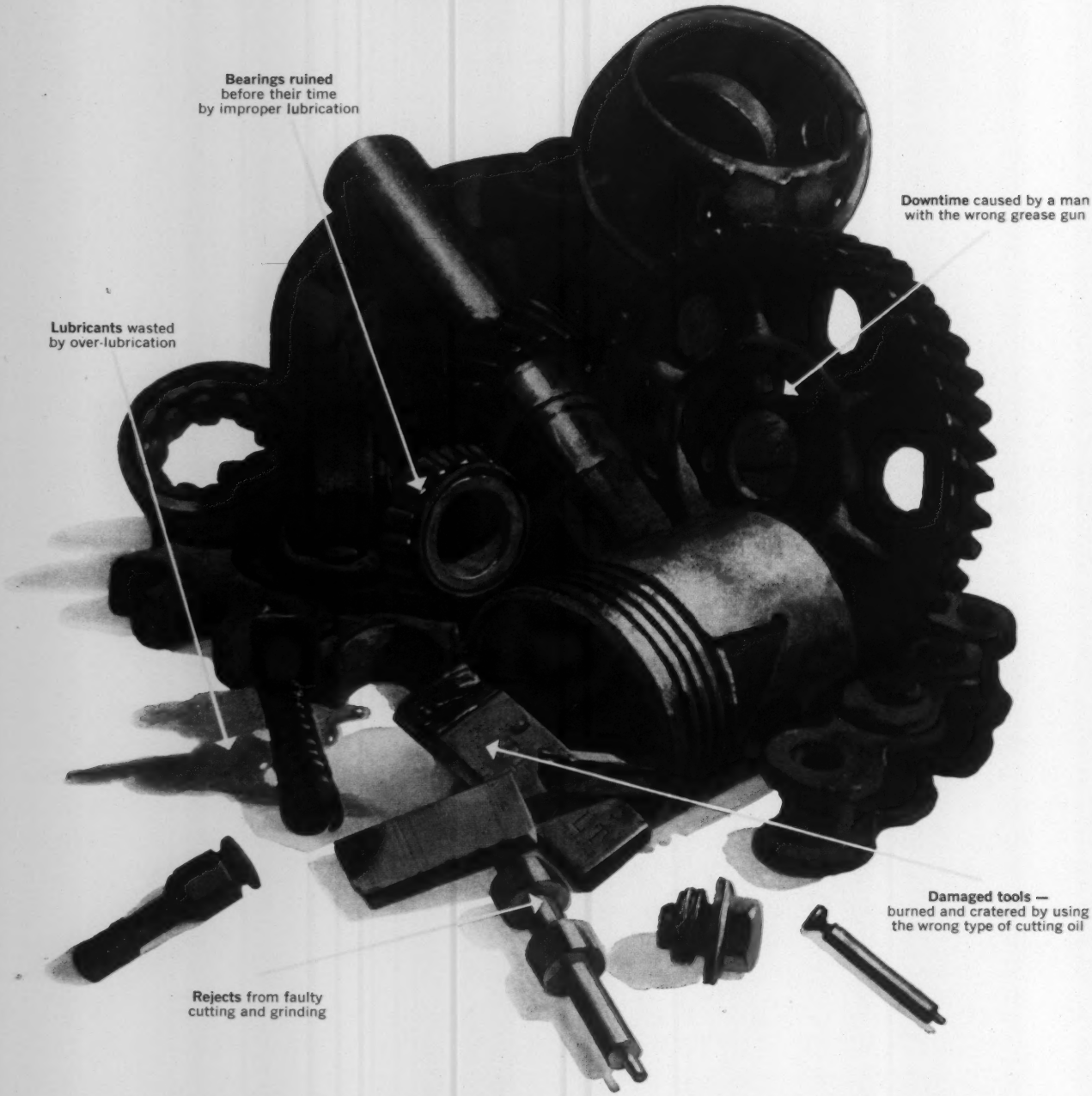
How to starve a scrap pile* at its source

* and all it represents

(DAMAGED TOOLS, RUINED MACHINES, REJECTS, WASTED LUBRICANTS, UNSCHEDULED DOWNTIME . . .)

TEXACO

Start a "STOP LOSS" program

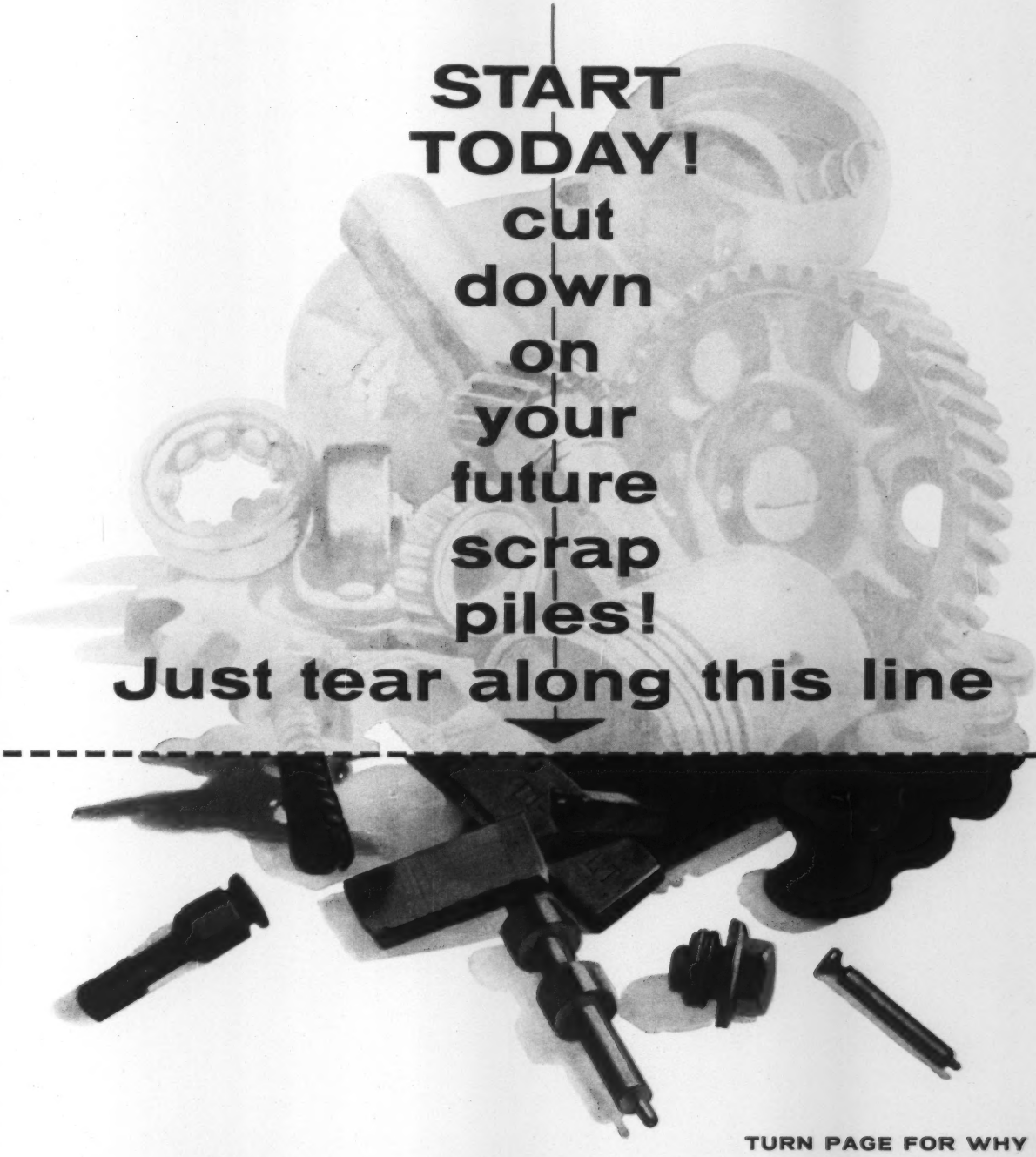

Bearings ruined before their time by improper lubrication
Downtime caused by a man with the wrong grease gun
Lubricants wasted by over-lubrication
Damaged tools — burned and cratered by using the wrong type of cutting oil
Rejects from faulty cutting and grinding

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

Texaco's "Stop Loss" program has been developed for progressive managers in production, maintenance, purchasing, engineering and accounting who wish to apply new methods to control costs and add to profits.

The program has two purposes: (1) to demonstrate how organization of lubrication practices can be used to control costs resulting from product rejects, downtime, machine repair, excessive inventory, and (2) to provide specific instruction material to help plant groups find out where and how they can use Organized Lubrication to control costs in their own operations.

Lubrication is common to almost all plant functions. So don't be surprised when the "Stop Loss" program reveals ways to save in many places!



TURN PAGE FOR WHY

Expect tangible results!

HERE'S WHY AND WHERE:

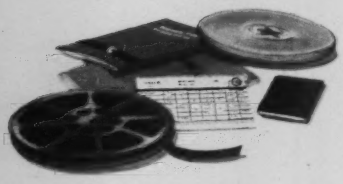
In 1959, hundreds of plants organized their lubrication practices to reduce costs.

Their managements had recognized this fact: *Lubrication is no longer just a routine operating procedure. It is a key factor in controlling costs and, as such, rightly becomes a management function.*

This doesn't mean that management must put on overalls and grab a grease gun. But when management recognizes the dollars-and-cents significance of Organized Lubrication, they have made the first step toward reduced costs throughout the plant.

The Texaco Organized Lubrication Plan studies your lubrication methods in terms of long-range savings in production, equipment life, manhour utilization and inventory. A re-evaluation in terms of Organized Lubrication usually reveals how immediate savings can be made and continued.

Texaco has developed techniques and experience to make this new concept operative. They are offered to you, with the understanding that any Organized Lubrication program depends for success on those who adopt it and apply it.



Here's the help you need to starve YOUR scrap pile

Here are the parts of the Texaco Organized Lubrication Plan available to interested plant groups:

1. "Stop Loss with Organized Lubrication," a new 25-minute color and sound film created to show the opportunities for cost control through "Organized Lubrication."

2. A film "package" for plant departments. This consists of movies on cutting oils, greases, hydraulic oils, etc., that may be selected for showing after seeing the "Stop Loss" film.

3. Coordinated booklets on the film subjects and others to be used as guides in specific areas.

4. A Texaco Lubrication Control System to take the guesswork out of your lubrication scheduling. This simple system costs almost nothing to install, yet can save up to 15 per cent of your maintenance costs.

We can promise you that a modern Texaco Organized Lubrication Program will produce a package of economies in your plant. Texaco Inc., 135 E. 42nd St., N. Y. 17, N. Y.

FROM

YOUR NAME_____

FIRM & ADDRESS _____

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FIRST CLASS
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BUSINESS REPLY CARD
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POSTAGE WILL BE PAID BY

TEXACO INC.

135 East 42nd Street

New York 17, N. Y.

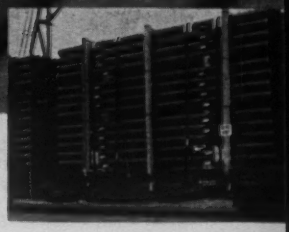
DEPT. IA-151

This is your ticket to see Texaco's vital new movie "STOP LOSS"

Sign and mail it today!

TEXACO

25 YEARS—NO STRAP FAILURES!



Acme Idea Man Paul Koenig keeps Southern Pipe Division of U. S. Industries, Azusa, California, briefed on latest developments in strapping, strapping tools and methods.

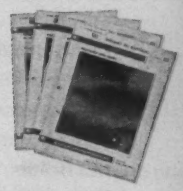
During the past 25 years, the Southern Pipe Division of U. S. Industries has braced all carloads of steel pipe with heavy-duty Acme Steel Strapping without a single strap failure. Nor have they experienced trouble of any kind with load loosening.

Underlying this record is the consistent quality of Acme Steel Strapping, plus continually improved strapping tools and methods. Ever-secure carload bracing has helped this major producer build important customer good will, as well as cut costs, over the years.

Investigate how Acme Steel's experience can help you secure greater good will and savings. Call your Acme Idea Man or return the coupon.

ACME STEEL IDEA LEADER IN **STRAPPING**

ACME STEEL COMPANY
Acme Steel Products Division
Dept. IFS-120
135th St. & Perry Ave.
Chicago 27, Ill.



Please send me Idea No. U2-9 and examples of how major companies in my field use Acme Steel Strapping.

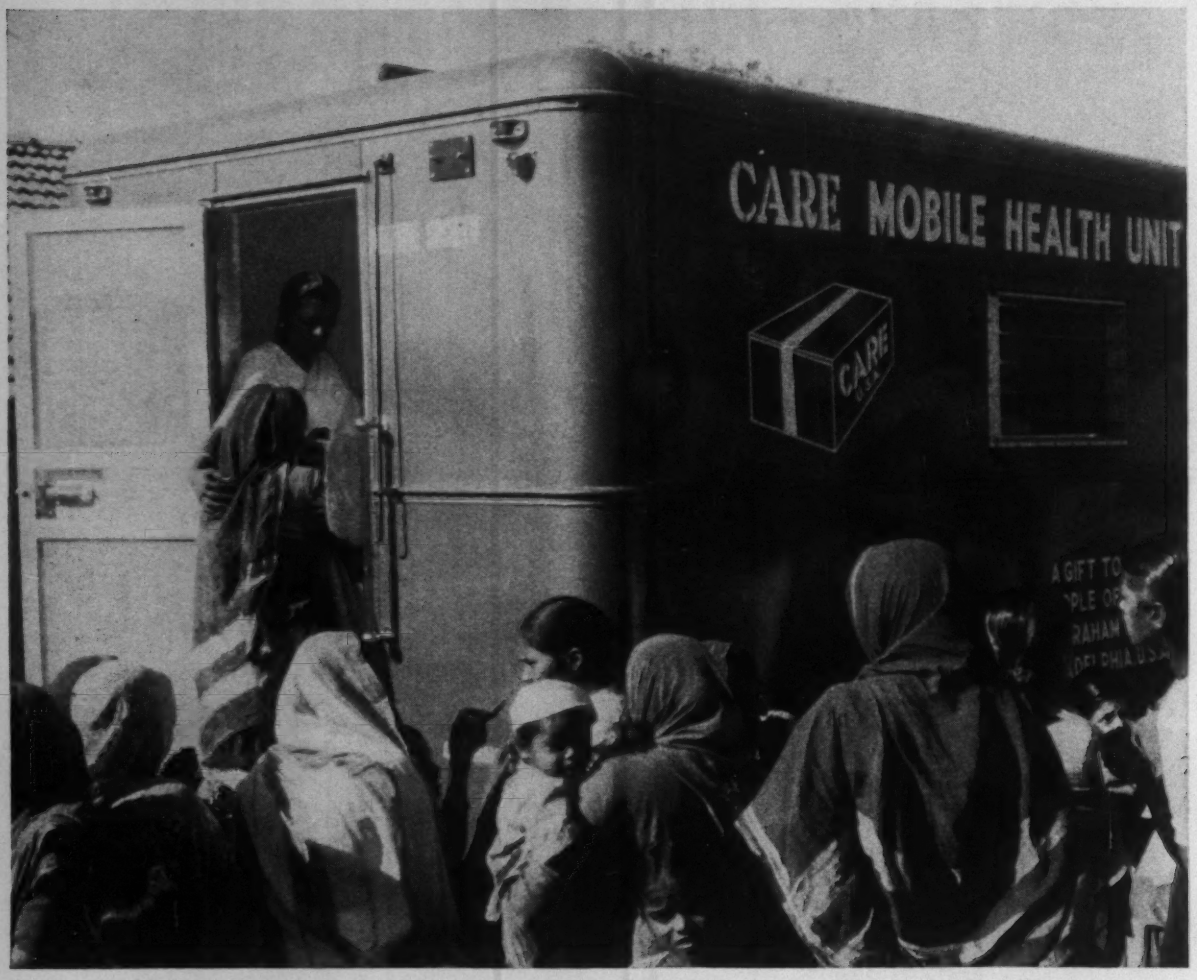
*Name*_____

*Title*_____

*Firm*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____



Your CARE dollars save lives

Here is the biggest "CARE package" the people of America ever sent to desperately poor people of other lands: A mobile health unit which brings medical care to four villages in India. It heals the sick. It teaches simple hygiene. It helps people find strength enough to lift themselves by their own bootstraps.

Typical clinic-on-wheels includes examination-operating table, medical and surgical instruments, lab equipment, sterilizers, electric generators; in some areas, film and slide projectors for teaching purposes.

The unit above is sponsored by the Bombay Mothers' and Children's Welfare Society and staffed by a native medical team—doctor, nurse, technician, driver-helper. Diagnosis ... treatment ... surgery ... preventive medicine—all are part of the job.

Currently, 16 such units—provided by you through CARE, but operated and maintained by responsible local groups—are at work in India, Ceylon, Egypt, Poland, Mexico, the Philippines. Urgent appeals for similar units are far beyond available CARE funds.

What does a mobile health unit cost? Around 11,500 dollar bills pooled together. But it treats about 20,000 people a year—that's 58¢ per patient. Divide that by its many years of service ... calculate, if you can, the immeasurable human good every penny does—and you know that CARE dollars ear-marked for health units buy the biggest bargain on earth. Will you help? Send dollars to CARE, New York 16.

CARE COOPERATIVE FOR AMERICAN RELIEF EVERYWHERE, INC. 660 FIRST AVE., NEW YORK 16, N. Y.

Here is $____ towards health unit ☐
food ☐ tools ☐ books ☐
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Aside from their unique combination of desirable properties, a distinct and important advantage in using BERYLCO beryllium copper alloys is their easy availability. It's the same with service. A phone call or conversation can often help you use BERYLCO advantages better . . . cut waste . . . save time and effort. These three things—product advantages; quick, easy availability; prompt service by highly skilled and experienced men—have made BERYLCO alloys first choice of industry.

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Stanscrew service helps insure precision of *Gilbarco* pumps

Gilbert & Barker Mfg. Company builds its famous Gilbarco gasoline pumps for oil companies large and small, and ships them to every state in the union as well as to most countries overseas. To insure precision and dependability of these pumps, great care must be taken in all assembly operations. Fasteners, for instance, must be torqued precisely to keep all components in perfect alignment.

Because of the critical importance of fasteners to its products, Gilbarco has selected Stanscrew heat-treated cap screws for such key applications as the positive displacement meter (shown in the insert). Stanscrew fastener specialists were happy to assist Gilbarco engineers in determining the right fastener with the correct torque to assure trouble-free service.

Gilbert & Barker is one of a long roster of honored names in American industry who have found it pays to standardize on Stanscrew. A product of unsurpassed quality . . . a broad selection of more than 5,500 different fasteners . . . prompt service through local distributors, backed by complete stocks at three conveniently located plants . . . these are a few of the reasons Stanscrew means greater value in fasteners.

Stanscrew's experienced fastener specialists can often suggest ways to improve your assembly procedures. Your local Stanscrew distributor will be happy to arrange a prompt visit. Call him today.

STANSCREW FASTENERS

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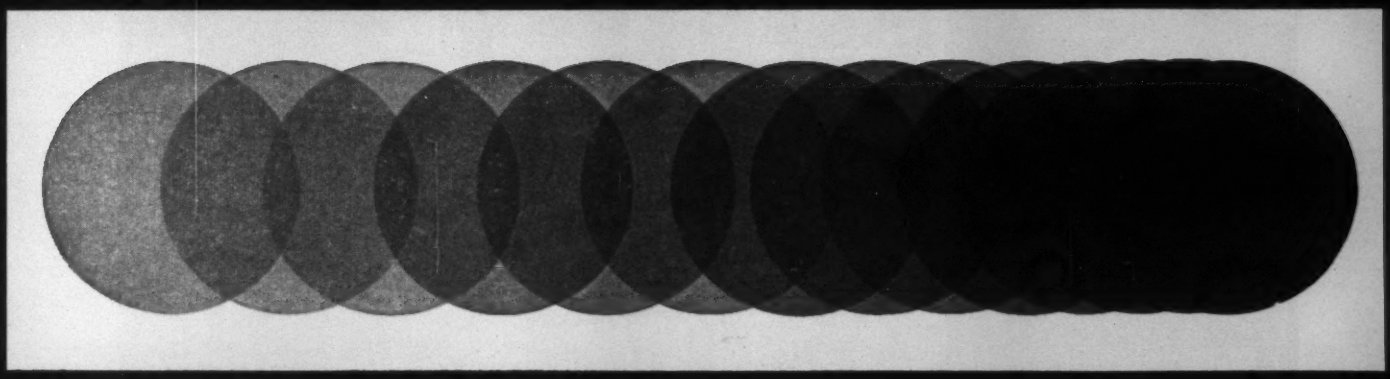

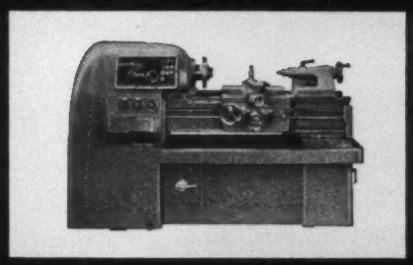

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Here is the ultimate in turning efficiency and convenience. Simply push a button until the spindle speed you desire indicates on the tachometer. A continuously variable range of spindle speeds from 43 to 3500 RPM is provided by a highly efficient, proven mechanical speed variator belt-less type drive unit . . . with full motor horsepower (3 or 5 HP) throughout the entire range and speed constant within .2%. But this is just one of the revolutionary features of the Nebel MICRO-TURN. Write today for your copy of the complete story on the new MICRO-TURN Lathe, described in Bulletin No. 219. Nebel Machine Tool Corporation, Lathe Division, 3415 Central Parkway, Cincinnati 25, Ohio.

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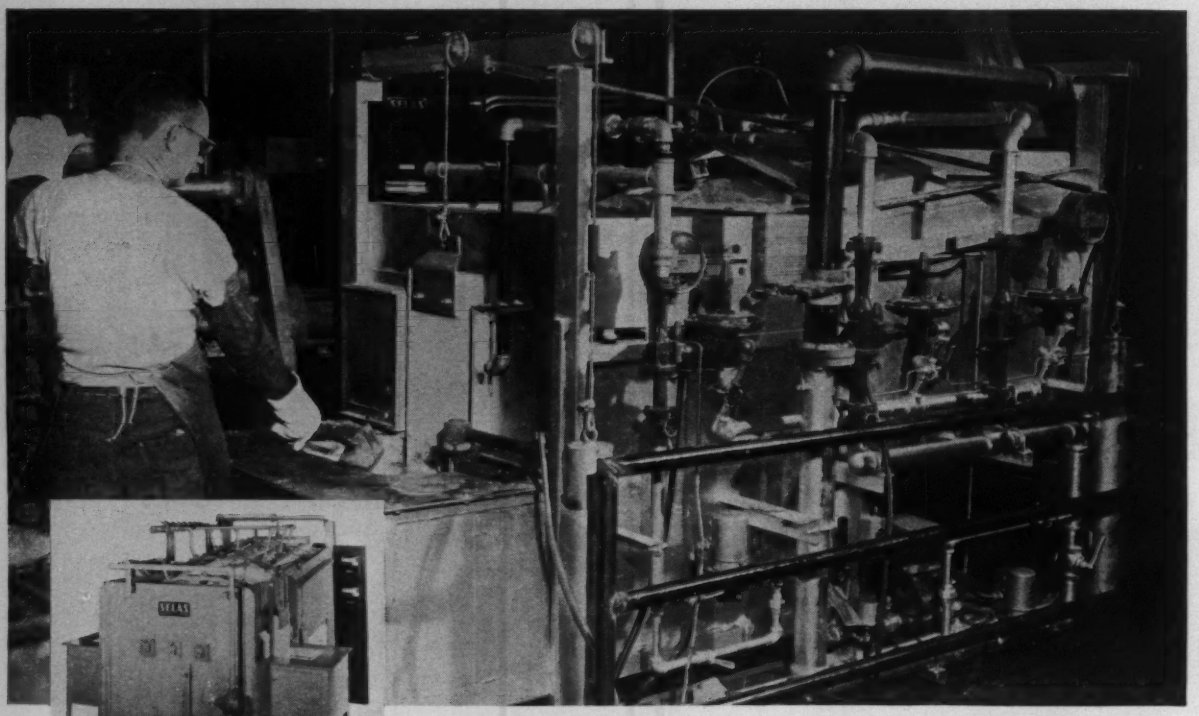
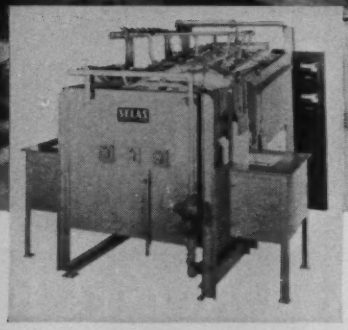
NEW SLANTS ON HEAT PROCESSING FROM SELAS

high purity aluminum melted without contamination in new Selas furnace



Selas single-well batch melting furnace accepts 30- or 50-lb pigs. 300 lb/hr capacity. Design incorporates door at charge end and over dip-well.



Selas double-well aluminum melter holds 1,000 lb of molten metal; controls temperature within close limits.

Electrical grade aluminum, 99.6% minimum purity, is required by the electric motor industry for die-casting of rotors.

Motor manufacturers use Selas dry-hearth melting furnaces to maintain this rigid specification for high purity molten metal. The Selas Gradiation® method provides close control of heat input; roof-fired Duradiant® burners deliver fast, uniform heating without flame impingement. Advanced design prevents transfer of silica from furnace refractory to molten aluminum.

Other proven benefits include the following:

- Metal temperature in holding section is maintained within close limits due to absence of any cold charges.
- Elimination of agitation and stirring keeps dross formation at absolute minimum.
- Operates with unusual fuel economy, continuously or intermittently, utilizing natural gas and air.
- Metal "frozen" during week-end shutdown re-melts quickly, without damage to furnace.

Selas aluminum melting furnaces are available in a wide range of capacities. At your convenience . . . without cost or obligation to you . . . a Selas field engineer will welcome the opportunity to survey your needs. For this personal service, or for further information about these furnaces, address your request to Mr. R. E. Buckholdt, Furnace Division.

SELAS CORPORATION OF AMERICA

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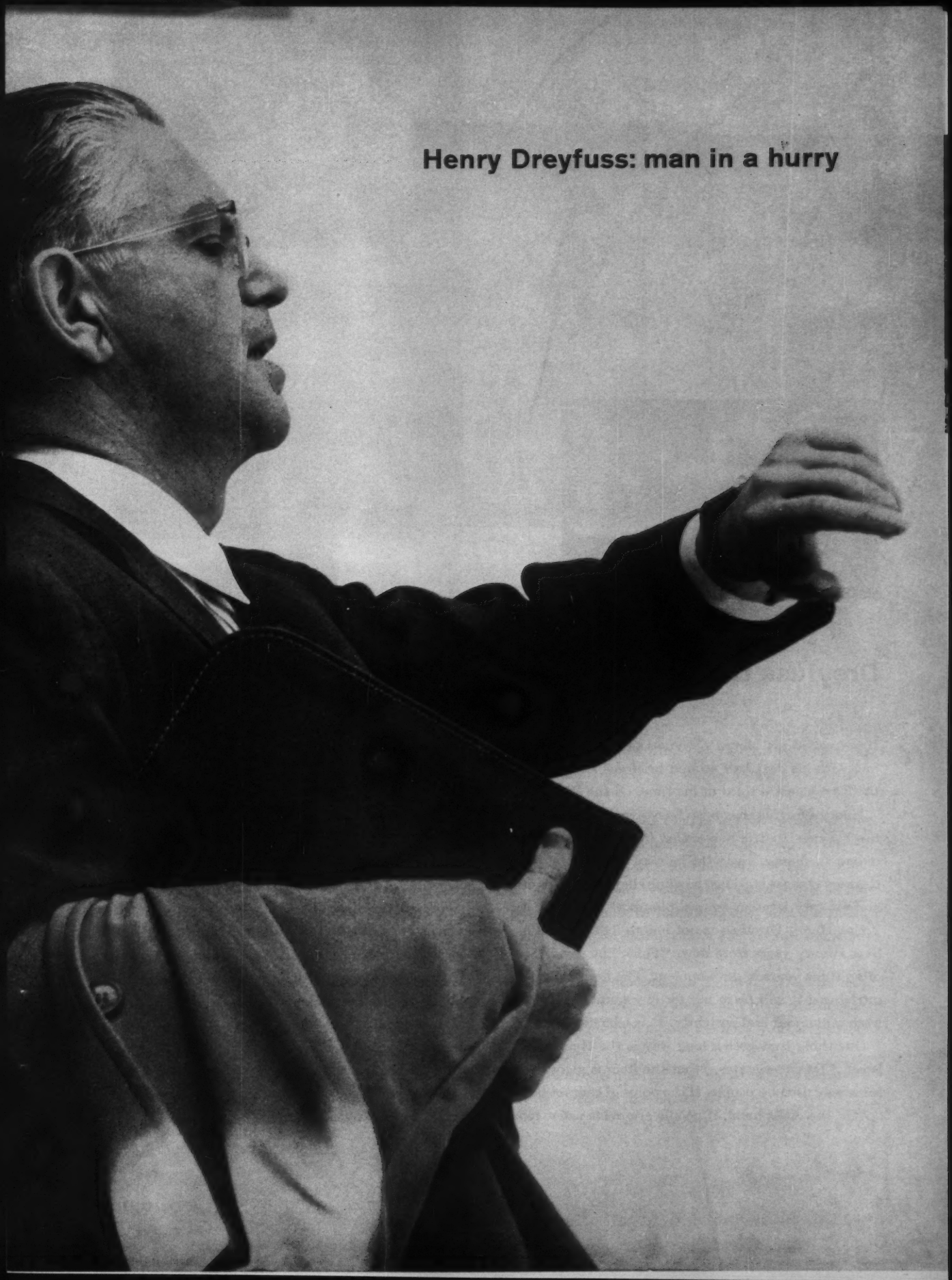


Henry Dreyfuss: man in a hurry

Dreyfuss talks design

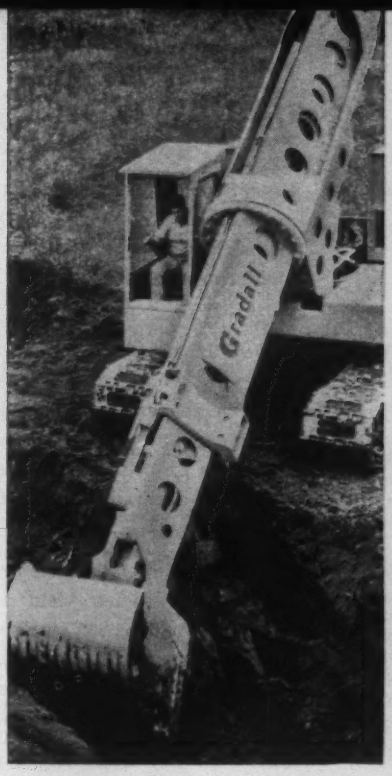
If you could get Henry Dreyfuss to sit still long enough for a caricature, the drawing would inevitably show him with his coat half on and briefcase in hand. Most likely, he would be on his way to the airport. He's on the East Coast a third of his time, on the West Coast a third, and the other third in between.

Henry Dreyfuss has been busy ever since he gave up scenery design in the late Twenties and helped pioneer the business that is now called industrial design. In the early days, he gave a new look to everything from hinges to pianos, cigarette lighters to tractors. Today he can look back on a career of redesigning vacuum cleaners and gas stations, bowling alleys and ship interiors, typewriters and dental equipment, magazine formats and military strategy rooms, plumbing fixtures and the Nike missile launcher.

But Henry Dreyfuss is not one to look back. There are designs on his boards today that will influence our lives twenty years from now. "Time," he says, "is one of the designer's big problems. A design assignment is often three years in development. The item may not be on the market for another three to ten years. After it's introduced it will be in use for any number of years. In order to design that far ahead, our ideas have to be fresh, advanced and sprightly. It is a challenge to have to think as far ahead as we do."

One thing that goes a long way is the Henry Dreyfuss design credo, and it is all about people. "It says in effect," Dreyfuss states, "that the item is going to be ridden in, sat on, looked at, talked into, operated or in some way used by people. If the point of contact between the product and people causes friction, we have failed.

"On the other hand, if people are made safer, more comfortable, more eager to purchase, more efficient, or



just plain happier—we have succeeded." And succeed Dreyfuss does, by following this yardstick for effective industrial design: 1. Safety and convenience of use. 2. Ease of maintenance. 3. Cost, including tooling, production and distribution. 4. Sales appeal. 5. Appearance.

Selection of the right material for the job plays an important role in satisfying each of the five requirements. As a matter of ethics and sheer common sense, Henry Dreyfuss, like any member of the American Society of Industrial Designers, will not endorse any one material. "We have worked with all materials. What we want is the material that is right for the job. We look for the material that combines reasonable cost with the ability to be fabricated economically, and at the same time will give the product the built-in quality and durability it needs to sell well." With no-nonsense requirements like that, it is not surprising that a great many Dreyfuss-designed products use steel in one way or another.

Steel has strength, integrity and honesty. Steel is what the designer is apt to call a 'natural.' Dreyfuss feels that the public's image of steel depends largely on the product itself. A massive steel vault door conjures up an image of strength, imperviousness. Stainless Steel tableware suggests style and modernity. Steel curtain wall panels give buildings the look of tomorrow.

The moral is this: steel has been with us for ages, yet it is the modern metal, the metal of the future. Its enduring modernity will continue to be recognized, and used, by designers like Henry Dreyfuss.

(turn the page for a new look at steel)

USS TRADEMARK **United States Steel**

designing with USS High Strength Steels

Good design goes beyond material selection. Once the choice has been made, the designer's job is to take full advantage of the material's properties. Few materials offer designers as much opportunity as high strength steels.

COR-TEN Steel was developed by U.S. Steel and first used in 1933.

USS COR-TEN Steel is a name that has become a byword in design circles. It is a time-tested, high strength low-alloy steel. Structural designers welcomed COR-TEN Steel because it allowed them to pare dead weight and to lower maintenance costs. As structures, mobile equipment and machinery got bigger and bigger, dead weight became more of a problem. Even when weight could be shaved without stress problems, durability suffered. This high strength steel answered both problems.

Dead weight in stationary structures is costly; in mobile equipment dead weight requires more power to move.

USS High Strength Steels' yield points are all 50,000 psi min. compared to 33,000 psi for structural carbon steel.

Strength did it. COR-TEN brand and other USS High Strength Steels have a 50% higher yield point than structural carbon steel. They permit as much as 33% weight reduction. They have superior resistance to atmospheric corrosion and abrasion, so there is little reason to overdesign. Their fatigue and impact properties are excellent. Here is a quick look at three well-known USS High Strength Steels:

Send for the manual described at the right for a comprehensive guide on how to design with high strength steels.

USS COR-TEN Steel has a yield point 50% greater than structural carbon steel, has four to six times its resistance to atmospheric corrosion. It is used to do any one of these three things: 1) in slimmer sections to cut weight at no strength loss; 2) in equal sections to increase load-carrying capacity, cut maintenance and lengthen life; and 3) any number of combinations of 1 and 2. COR-TEN Steel also has greatly superior paint adherence and is used where a longer interval between repainting is wanted.

USS TRI-TEN Steel, with its 50% higher yield point than structural carbon steel, has superior notch toughness at low temperatures and keeps rugged equipment operating even in sub-zero weather. Its high endurance limit makes TRI-TEN Steel ideal for mobile equipment that must take repeated loading and reversals of stress. It is a natural for welded structures and bridges.

MAN-TEN Steel costs only about 20% more than structural carbon steel; TRI-TEN Steel about 36% more, and COR-TEN Steel 42% more.

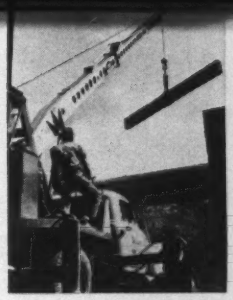
USS MAN-TEN Steel also has a 50% higher yield point than structural carbon steel, and is the low-cost member of the family. Weight reduction as little as 17% with MAN-TEN Steel will save money on material cost alone. MAN-TEN Steel is a tough, durable steel and widely used in earthmoving equipment, truck frames, material handling apparatus and riveted bridges.

High strength steels represent but a few of the over 3000 grades of steel in existence today. United States Steel makes a complete line of high strength steels, as well as constructional alloy, stainless and carbon steels. Bring your design problems to us. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

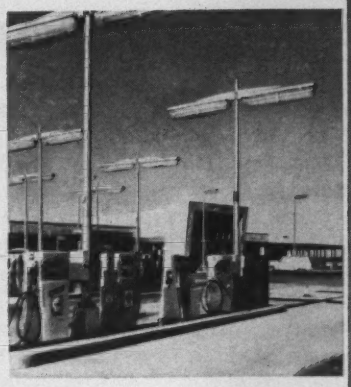
USS, COR-TEN, MAN-TEN and TRI-TEN are registered trademarks.

Watch United States Steel's special Christmas show, **The Coming of Christ,** in Color on NBC-TV, Wednesday, December 21, 8:30 P.M., E.S.T.

USS **United States Steel**



Cranes have to operate in all-weather temperatures and are subject to stress and shock. That's why many of them are made of tough TRI-TEN Steel.



Light standards stay good looking for years because of COR-TEN Steel's outstanding atmospheric corrosion resistance. Paint life is extended. Slim design is made possible by COR-TEN Steel's strength.

TRI-TEN Steel has cut weight and cost of dozens of major bridges. In the bridge shown here, TRI-TEN Steel saved a quarter of a million dollars.

One of the first applications of COR-TEN Steel was in hopper cars for weight reduction and longer life. Today, use of COR-TEN Steel can save hundreds of dollars over the life of a car.

MAN-TEN Steel, used in truck frames and body members, reduces dead weight and increases payload.

The LPG cylinder business uses considerable amounts of MAN-TEN Steel because of its strength, cost and ease of fabrication to lighten the weight.

This mark tells you a product is made of modern, dependable Steel.

Here's a book that is in the hands of thousands of engineers and designers. It is your guide to the design of lighter, stronger equipment and structures.

design manual for high strength steels

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New marketing assistance for

New Basic Market Map . . . an essential adjunct to any marketing program. Emphasizes the 86 industrial areas in 20 states accounting for more than 90% of metalworking plant employment. No trouble visualizing sales areas because the big markets are printed complete with latest plant and employment figures.

New Basic Metalworking Data . . . for years the most popular private census of the metalworking industry, now your key to The Smart Sell in the Sixties. You can concentrate your sales efforts on the plants that pay off by taking advantage of this latest information on every metalworking plant with more than 20 plant workers in the nine important metalworking industries. Data are summarized nationally, by states, and by industrial area. Plants are listed by 2, 3, and 4-digit SIC codes with actual employment figures. There's complete information on secondary producers in each 4-digit SIC group by industrial area. And plants are tabulated for all basic metalworking operations.

But there's more to marketing than the figures. Iron Age marketing and sales techniques are field-proved. They've been used for years by outstanding companies to locate markets, establish market potential, analyze distribution channels, set-up sales territories, and measure sales performance. These down-to-earth marketing techniques are set forth in detail in the encyclopedic introduction to the new volume of data. An unequalled text in practical shirtsleeves marketing, the introductory section is being reprinted separately for wider distribution through your company.

The Smart Sell

Two New Master Lists of metalworking plants bridge the gap between market research and sales planning . . . helping you convert the statistics describing your markets into the names, addresses, and characteristics of flesh and blood companies. If you purchase the Master List, you'll receive two volumes. One, arranged by company name, is ideal for coding sales records. The other, is arranged by SIC codes, then alphabetically by states, for converting statistics into prospects. And the price includes annual updating.

Automated Market Planning is yours with the Master List on IBM cards . . . at least to the extent of sorting and tabulating the necessary statistics. Once you decide on the market characteristics, you can have IBM equipment build a prospect list on the basis of industrial area, geographical location, primary or secondary products, employment code plant workers, departments operated, or any combinations. The new two-card deck includes departments operated, has 44 open columns you can use for coding your own sales information. Like the Master List, purchasing the cards includes annual updating.

IRON AGE

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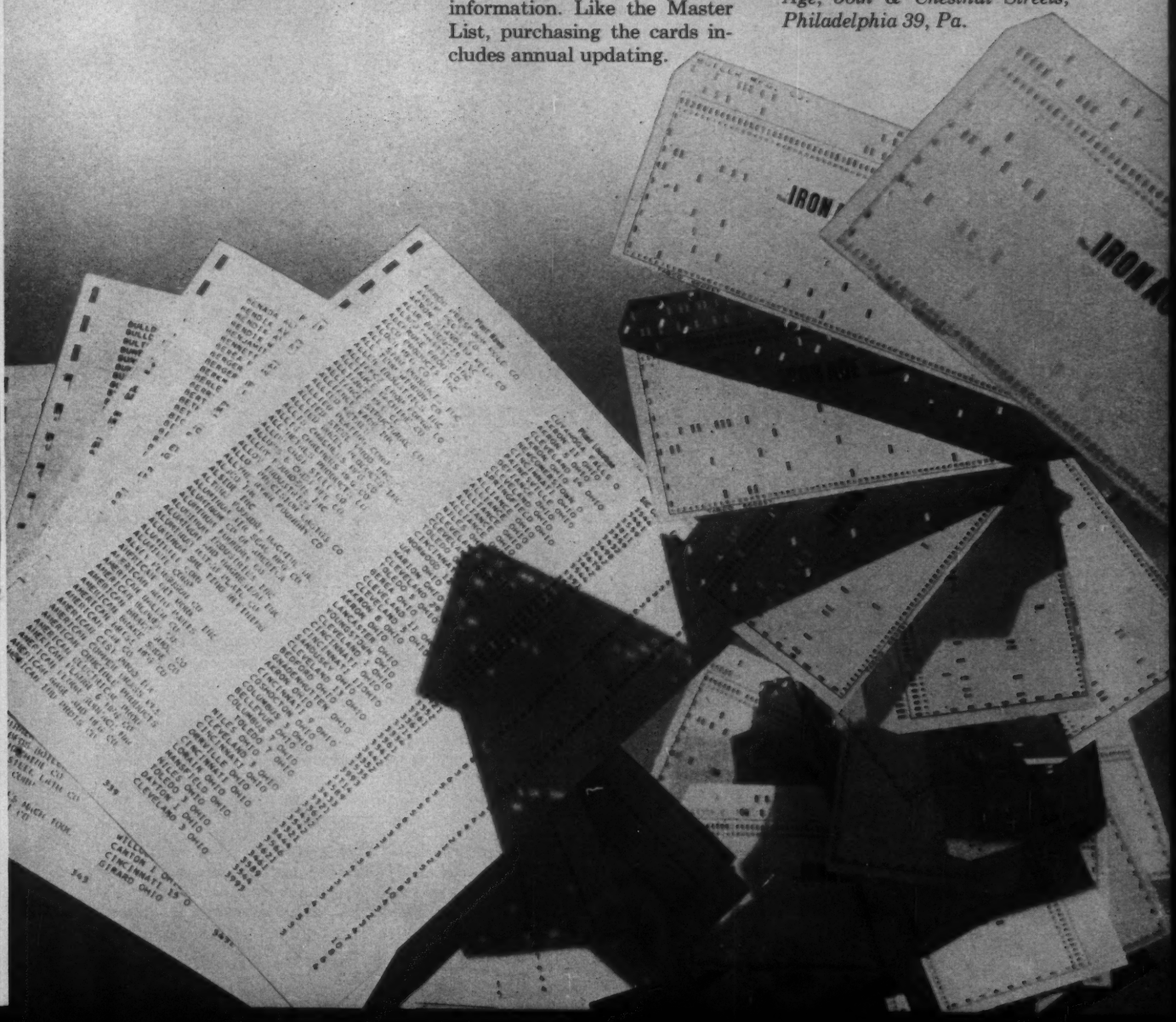
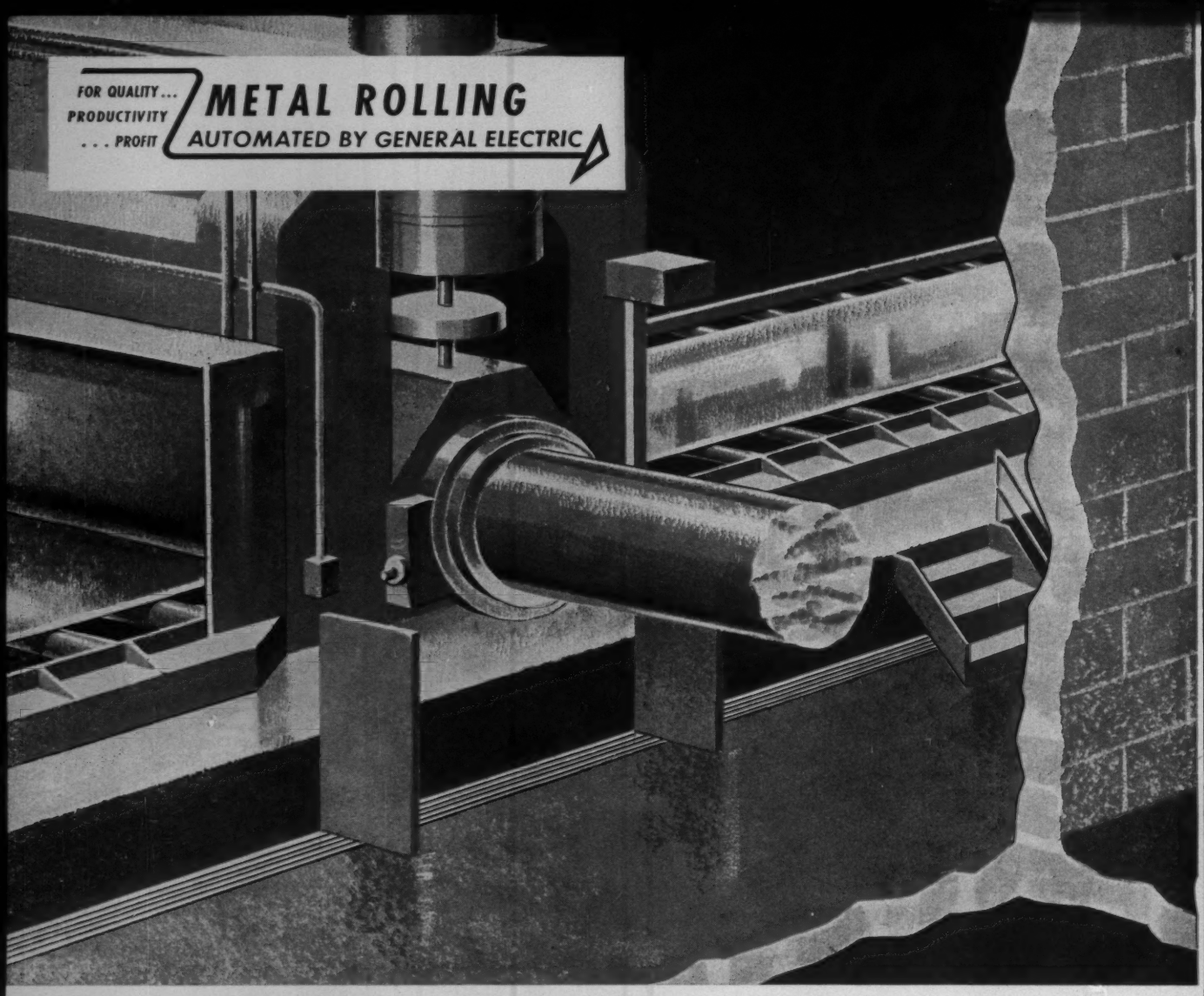
a chilton publication

There you have the barest essentials of the Iron Age 1961 Market Planning Package. *Not just a theory . . . not just numbers, but a practical, proved basis for your marketing program to metalworking. Get in touch with your local Iron Age representative, for details. Or, write Iron Age, 56th & Chestnut Streets, Philadelphia 39, Pa.*





GENERAL ELECTRIC CONTROL FOR STEEL MILLS

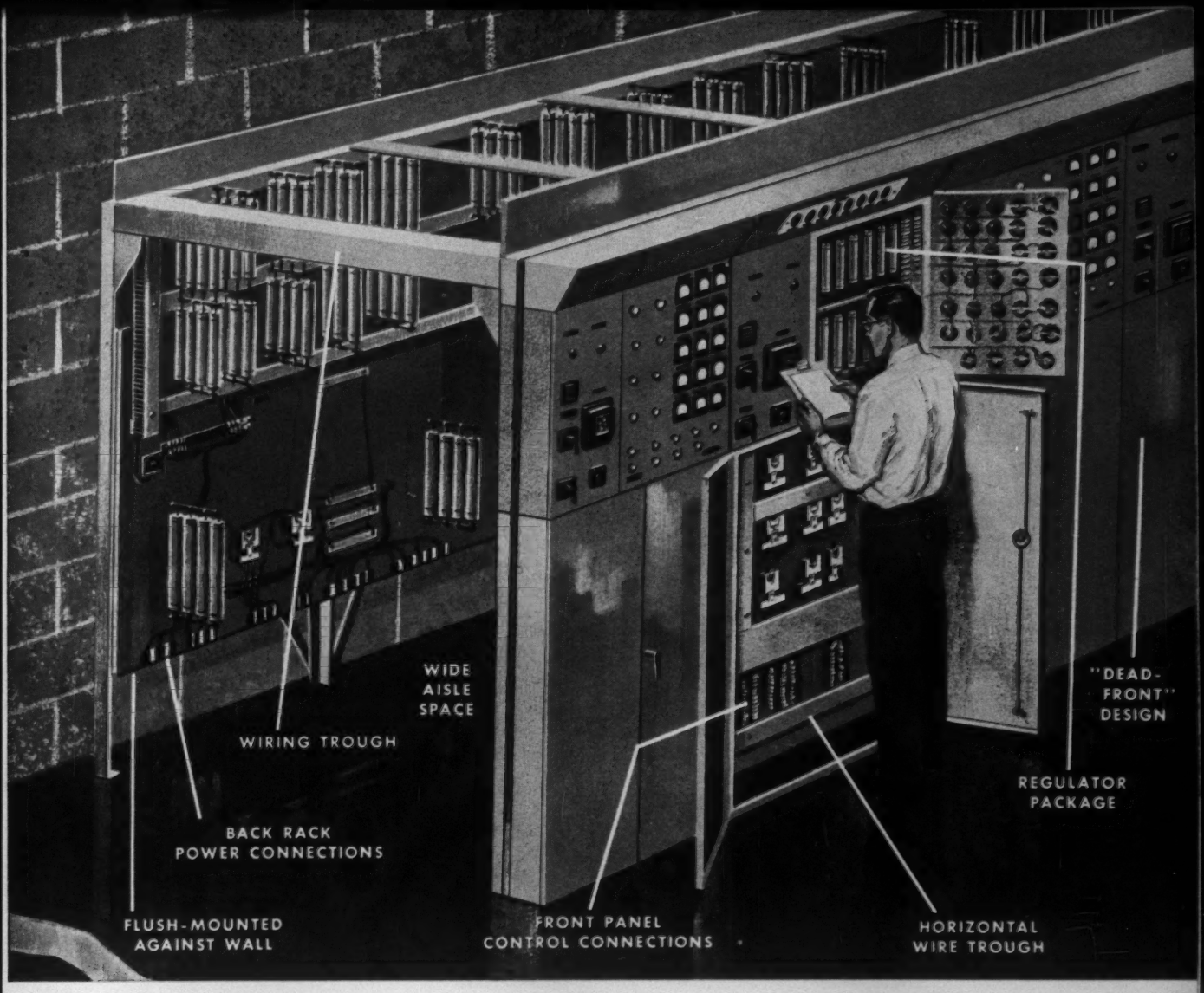
New control panels cut connection

General Electric has redesigned its industry-proved, heavy-duty, steel mill control panels—adding features to permit greater utilization of mill space . . . to save you time and money in installation and maintenance . . . and increase safety for operating personnel. The following cost-cutting and work-saving benefits tell the story of these new panels:

Reduced floor space—Compact design of this new panel cuts floor space needs up to 35 percent. More efficient arrangement of components provides added room for work inside the panel, yet reduces panel length. All incoming wires for control terminate at the front of the panel. All power wiring, including customer power connections, is isolated on the back rack. Use of welded studs and cage nuts permits installation against a wall —no need for additional work space behind panel. This saving in space means that valuable floor area can be used for other purposes, or construction costs of new buildings can be reduced.

Easier field connections—Installation wiring time is reduced as much as 50 percent by improved wiring layout. All incoming control wiring is brought to the front of the panel. A horizontal wire trough is available to the contractor to facilitate wiring to proper terminals and eliminate cord-tying bundles of wires in the field. Doors on the front of the panel open for access to terminal boards. For quick identification, terminal designations are permanently ingrained on the terminal board and into high-quality, plastic sleeves on each wire end.

Simplifed maintenance—Wide aisle between front panel and back rack makes maintenance easier and safer. Devices on front panel and back rack are connected *from the maintenance aisle,* allowing work from only



time 50%, required floor space 35%

one location. On the regulator package, fine-tuning adjustments are easier since potentiometers are located next to their related meters.

Increased safety—Since power wiring and all field power connections are isolated on the back rack, operating personnel are protected from accidental contact with high voltage. "Dead-front" construction, utilizing regulator packages and front panel devices behind doors, affords additional protection.

Improved appearance—All-steel bases provide rugged construction and uniform panel shape. Packaging of equipment into functional components and placement of contactors and relays behind doors give straight-line, modern appearance to panels.

For details on these steel-mill control panels, see your G-E Sales Engineer. Or write Sect. 785-13, General Electric Co., Schenectady, N. Y. for Bulletin GEA-6701. *Industry Control Dept., Salem, Va.*

Progress Is Our Most Important Product

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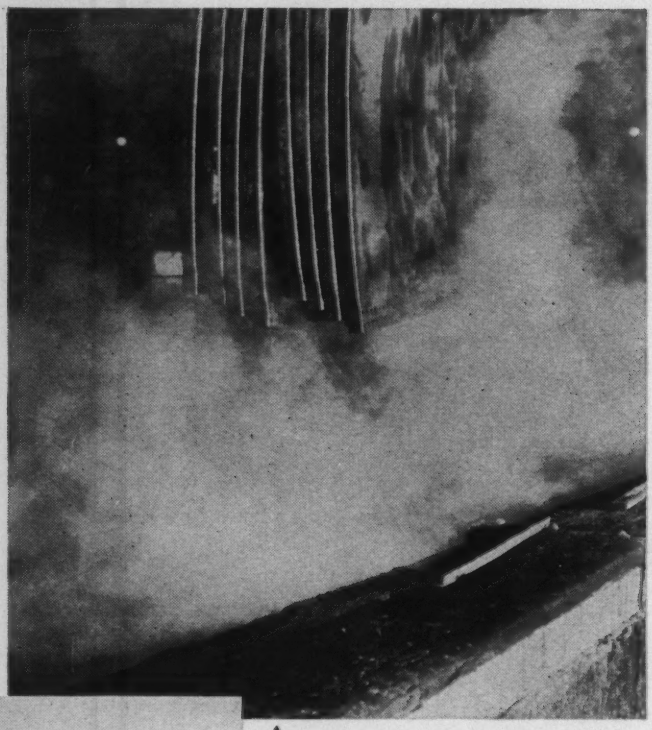
ANOTHER CORROSION PROBLEM SOLVED BY GALVANIZING

HOT ZINC BATH

Keeps Oil Tanks From Going "Sour"

Galvanizing Protects Tanks Against Corrosion From "Sour" Crude Oil, Sulphur and Salt



^ Oil storage tank staves are hot dip galvanized for low cost corrosion protection.

< Located in Winkler County, Texas, these 1,000 barrel tanks of a leading oil firm are constructed of hot dip galvanized, bolted steel.

Down South, gulf coast oil operators fight an unending battle against storage tank corrosion. The enemies—"sour" crude oil, entrained salt water, sulphur gas, and salt-laden atmosphere can combine to knock out a painted steel storage tank in less than 3 years.

Hot Dip Galvanizing Cuts Tank Cost Per Year Of Service

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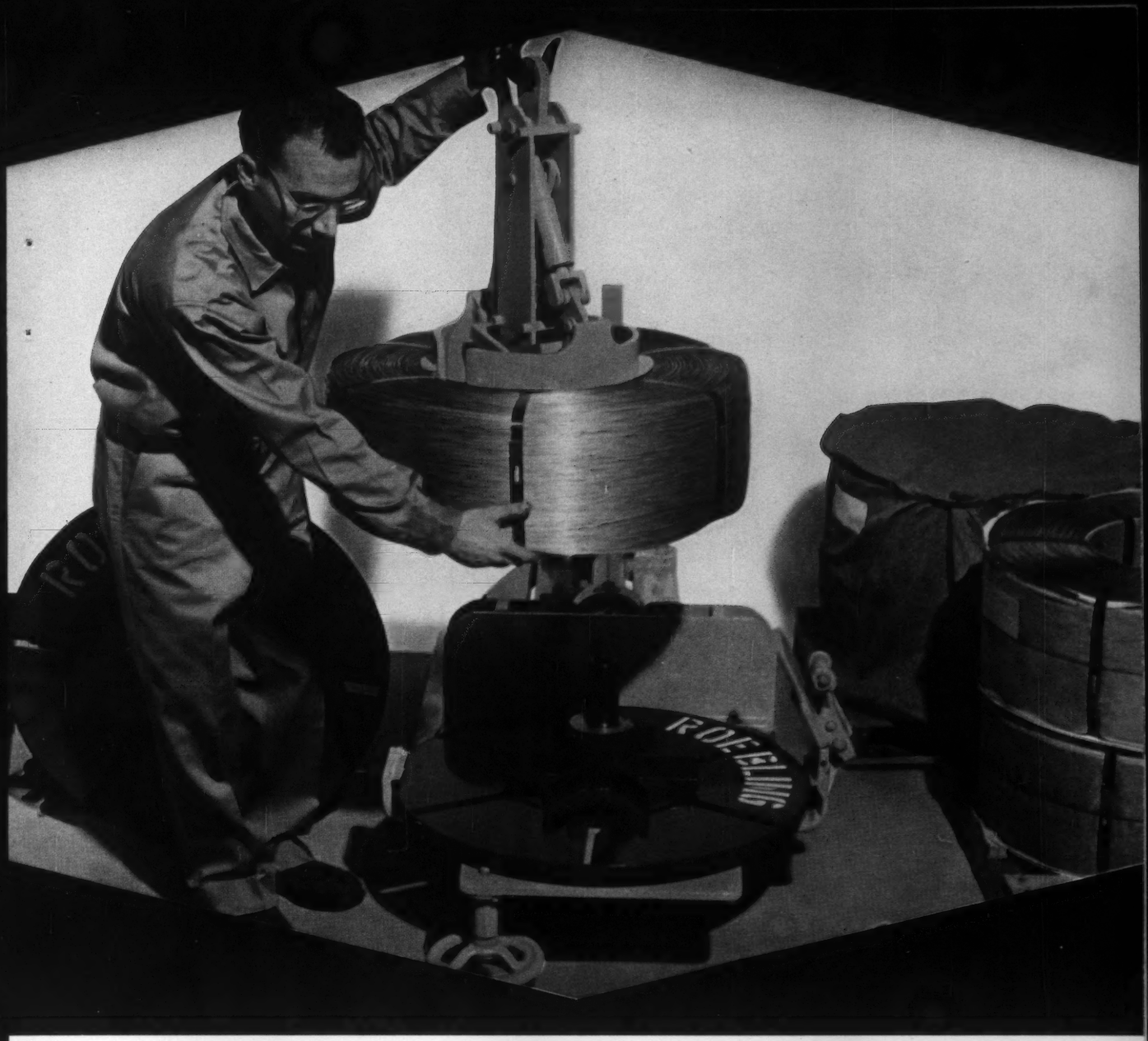

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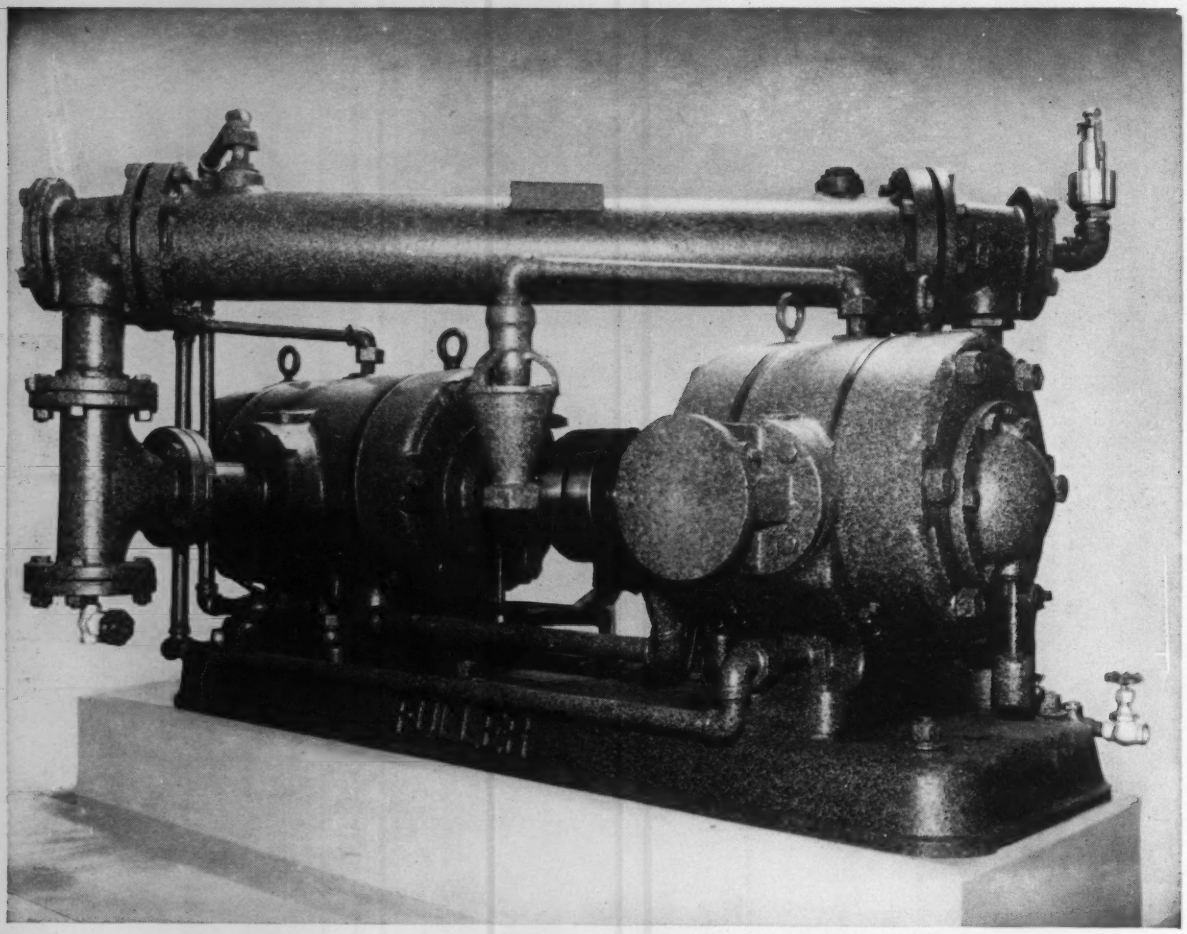

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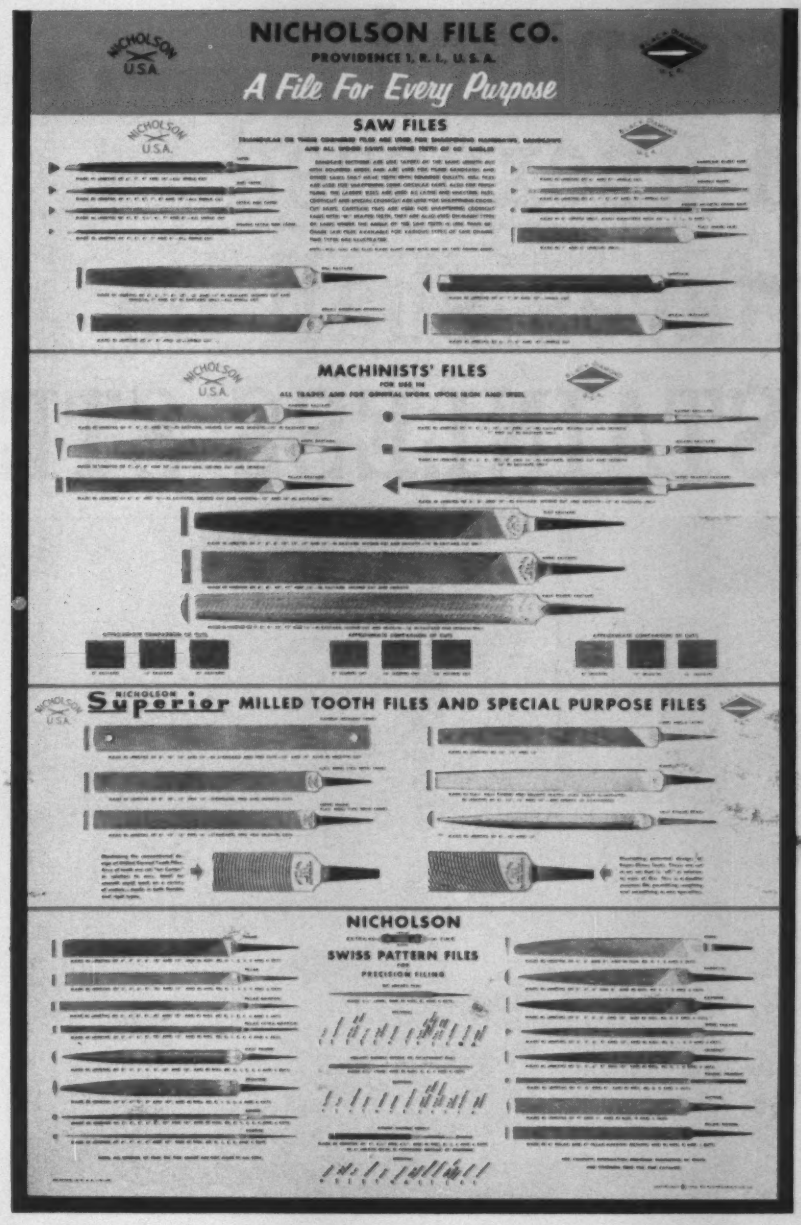

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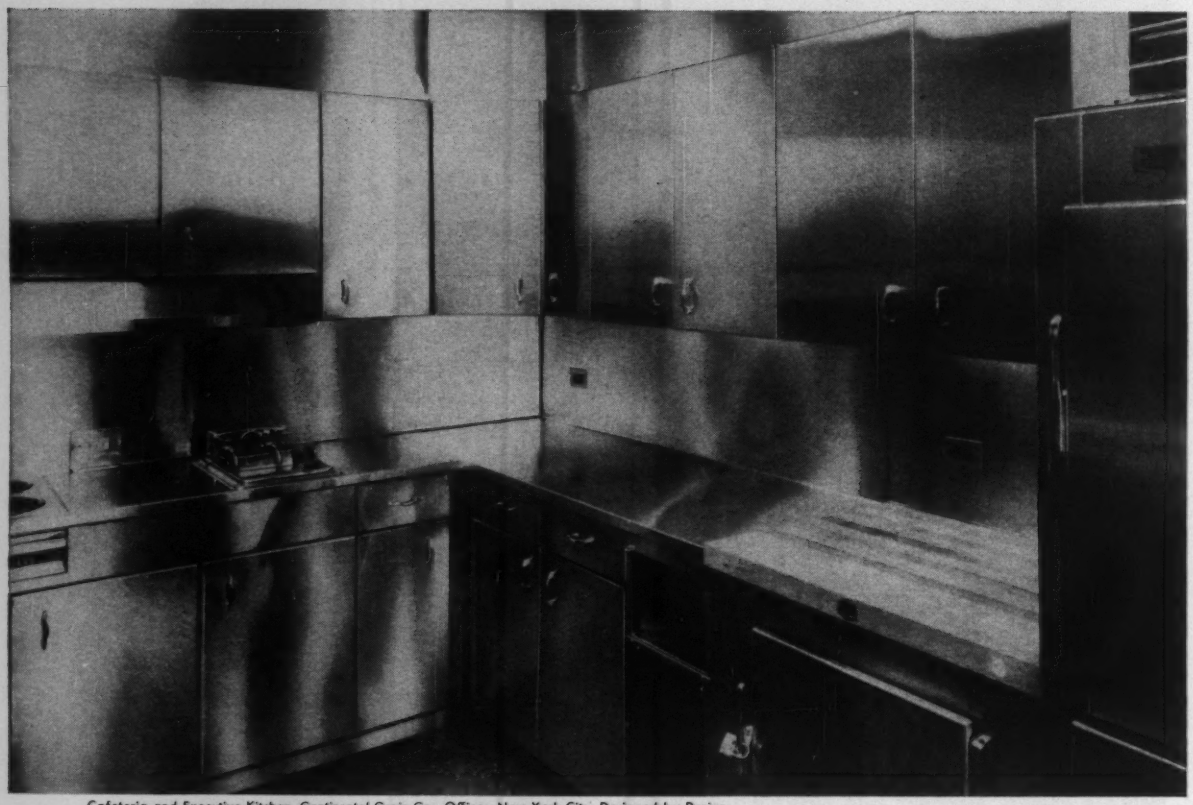

Cafeteria and Executive Kitchen, *Continental Grain Co.*, Offices: New York City. Designed by *Designs for Business, Inc.*, New York, N. Y. Fabricated by *Stainless Food Equipment Co.*, Newark, N. J. Installed by *Ben Mernit*, New York City

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ELECTRICAL MEN ARE PUSHING FOR GREATER USE OF CARBON STEEL in place of silicon for motor applications. This push will bring major changes in the buying pattern of at least one manufacturer this year. Fractional horsepower motors for appliances have been largely converted to carbon steel. The same metal is also being tried for motors up to 10 hp.

AUTO PRODUCTION for the second week of December hit close to 140,000 units, nearly 60 pct above the same period last year. About one out of three cars produced is a compact.

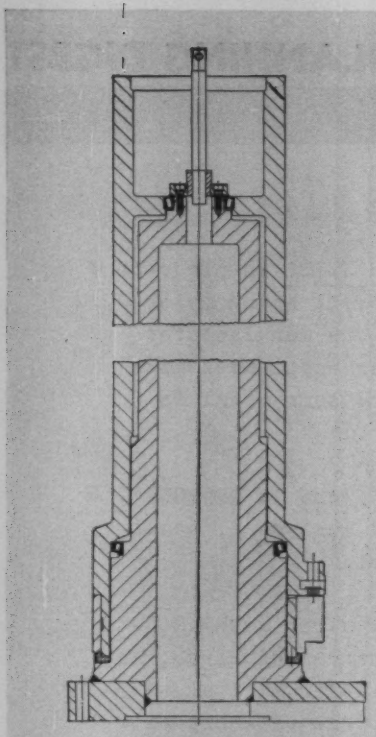
MAJOR APPLIANCE SALES IN 1961 are expected to be "on a par with 1960." This is the view of J. S. Sayre, board chairman of Norge. He says the self-service coin-operated dry cleaner will provide a "dynamic stimulus" to the industry. The cleaners will be sold to self-service laundries. Over 25,000 of these laundries are now in operation, up from 4,000 in 1956.

THE RECENT JUMP IN FREIGHT CAR ORDERS may be significant. Contra-seasonal activity in October caused orders to run ahead of output. The count: Deliveries, 4,632 cars; orders, 5,885 cars. September totals were 4,265 and 2,061 respectively. Usually, in past recessions, new car awards have had to await a general upturn. More orders may flow because of the many rundown cars.

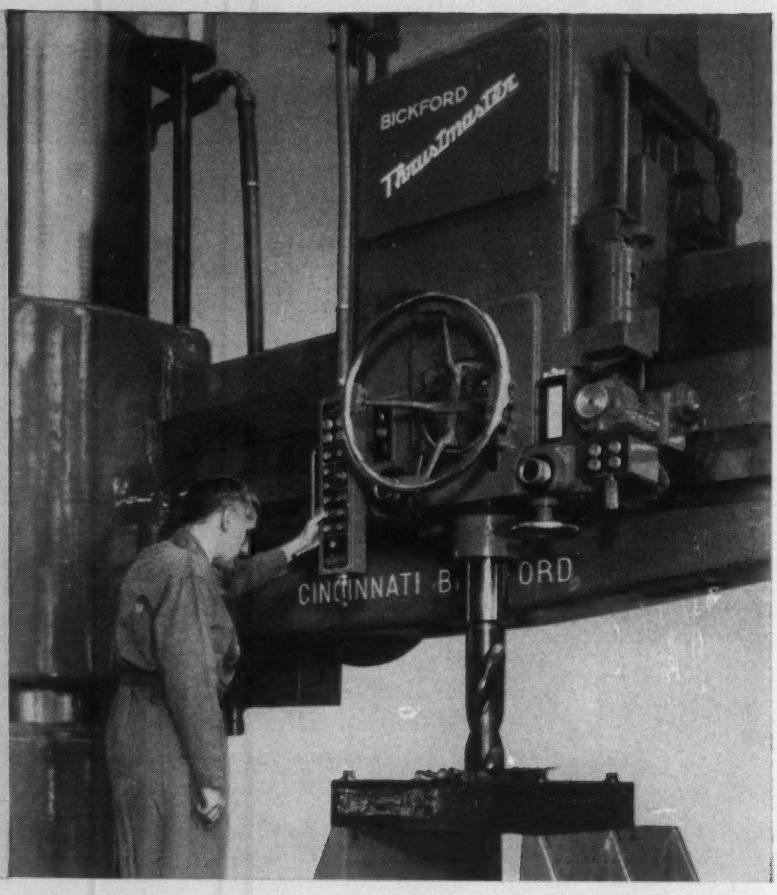
SALES SLIP, PROFITS FALL FOR U.S. MANUFACTURERS in third quarter, according to joint report of FTC and SEC. Sales fell off 4 pct from the second quarter; profits went down 11 pct.

BE WARY OF DECEMBER INVENTORY DROPS among your customers. Lowered stocks may not mean increased production or sales. Many companies will be liquidating stocks to minimize year-end state inventory taxes. Example: In Michigan for every $10,000 a company can shave from year-end inventory, it can put almost $400 into the profit till.

RAILWAY EQUIPMENT MAKERS MAY GET BOOST from renewed interest in mass transit. D. Hummel, new president of the American Municipal Assn., claims surface, elevated, monorail and subways are getting a hard look in attempts to solve big city traffic jams. His group has asked the government to extend half a billion dollars in loans to meet the problem.



How **CINCINNATI-BICKFORD** mounts column of "Thrustmaster" radial drill on Timken bearings to assure rigidity.



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WEIGHING 80,000 lbs. and driven by a 50 h.p. electric motor, this 34-inch diameter column "Thrustmaster", by Cincinnati-Bickford Division of Giddings & Lewis Machine Tool Company, is the world's most powerful radial drill. To resist stresses and reduce arm deflection, the column is mounted on large pre-loaded Timken® bearings—one at the top, one at the bottom. They give the column and sleeve the rigidity of a single piece, resulting in greater accuracy and longer tool life, with higher speeds and coarser feeds. And 39 more Timken tapered roller bearings are used in the drill head. Timken bearings assure better performance because they . . .

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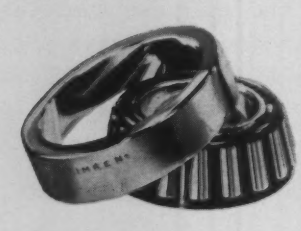

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"It must be tailored to the individual needs of the company . . ."

"Top management support is a key requisite for success . . ."

"Anything less than maximum effort can lead to disaster . . ."

Management Neglect Can Ruin A Good Job Evaluation Program

By **J. A. Patton,** Executive Vice President, George Fry & Associates, Chicago.

The best-conceived program of job evaluation won't work unless management follows through.

Careful care must be paid to all steps through conception, installation, and maintenance.

■ Job evaluation has made tremendous gains during the past 25 years as an important management tool. It is paradoxical that top management executives too often are responsible for the demise of a good program simply because they have failed to devote enough attention to the program once it has been installed.

Take the case of an industrial relations director who tried to run the job evaluation program of a southern plant from his Chicago headquarters simply by going south to negotiate the annual wage contract.

In his absence, wage rates began to spiral and serious inequities resulted. To avert complete disaster, the entire program was overhauled, it cost the company $50,000 in back pay to settle inequities. A new plan, locally controlled and subject to quarterly review, was set up.

Steps to Success — Three major steps are involved in the development of a successful job evaluation program: Conception, installation, and maintenance. Anything less than a maximum effort in each of these steps can lead to eventual disaster in a sound program. It also is fundamental that continuous top management support is a key requisite for success.

Directing the program should be a wage and salary administrator reporting to either a vice president of industrial relations or directly to the president of the company. If he is one step below staff level, he should still be high enough to carry weight with top management who can make policy decisions.

Each job evaluation program must be tailored expressly to the individual needs of the company. Considerable data is available about

Mr. Patton Answers: What Is Job Evaluation? . . . How Does It Work?

Job evaluation is the determining of the relative worth of the jobs in an enterprise. Fair pay differentials among jobs can then be established; pay inequities can then be corrected; most important—future inequities can be prevented. It is not scientific, but it is the most acceptable present-day method of determining, through a refinement of opinions, fair wage relationships.

One of four methods generally is employed in setting up the framework for a job evaluation program.

Most popular of these is the point system in which a committee selects factors such as experience, responsibility and physical effort in describing the job.

The committee then weighs each of the factors and assigns a range of point values. Each job is evaluated and point values determined. Total point values for each job are then used to rank all jobs on a scale and consistent wage rates are established for each level.

Although complex, the main advantage of the point system is that it is easily understood and explained.

Factor comparison is a second technique. This involves establishing a job comparison scale which consists of a series of factor-rating scales, with key jobs ranked and valued under each factor. Other jobs are then rated by making job-by-job comparisons.

A third method is job ranking, which is simple and inexpensive. This technique involves ranking all jobs from highest to lowest with respect to relative difficulty. Each job is considered as a whole; factors and components ordinarily are not broken down and compared separately.

Predetermined grading is the fourth method. This consists of establishing and defining grades based upon the characteristics of jobs at different levels of difficulty, then classifying jobs according to grades. Although easy to establish and more accurate than ranking, the evaluation committee must be familiar with all the jobs, and some individual jobs which combine both difficult and simple aspects often are hard to classify.

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the mechanics and operation of a plan, but this background should be used only as a guide.

Good Communications — The second step in developing successful job evaluation is installing the program. A thorough job of communications to employees and management is the most important element at this stage of job evaluation development. Everyone — from the president to the hourly-rated worker—should attend training classes, be told what job evaluation is and how it works. At this stage, it is a selling job to management, to the union, to the workers, and to the supervisors.

Maintenance of the program is the third, but never the final step. Regardless of how good a program may be or how well it has been installed, the dynamics of business operations must be reckoned with by top management almost on a daily basis. Certain principles of job evaluation must be safe-guarded and should never be sacrificed for the sake of expediency.

On the other hand, modifications of a company's program definitely are in order periodically based on long-range management planning. In a sense, the best job evaluation programs are like a good marriage: All parties have to work at it all the time to make it successful.

Tailor to Needs—The first step is to establish the framework for the plan. Some companies make the mistake of adopting a standard or "canned" program that has been used elsewhere and attempt to impose it upon their own firm without change or revision. Despite its soundness, there is usually a negative psychological reaction if job evaluation administrators are forced to conform to a rigid standard plan. This problem can be avoided if they are allowed to shape a plan to particular company conditions.

One large manufacturing company successfully developed an outstanding job evaluation program for one of its small operating divisions. The management of this firm then assumed, incorrectly, that this same plan, in every minute detail, could simply be adopted by all its other divisions, regardless of the differences which existed in terms of local union relationships, local working conditions, and communications problems. Ignoring all these important factors, the company-wide job evaluation plan soon foundered and was wrecked.

Acceptance a Must — This is further proof that job evaluation plans must be created by a skilled team of management and union representatives, not turned out of molds according to a rigid, uniform set of preconceived specifications. It makes little difference whether the plan has too many factors or too few factors. In the final analysis, success will be determined by its acceptance.

It is best to make a fresh start in establishing wage rates in setting up a program. It is safe to assume, generally, that the origin of existing rates lies in the changing conditions of supply and demand and subjective influences. Therefore, these rates should not be used as a guide in determining new rates.

Careful Preparation — Carefully prepared job descriptions, approved in advance by the department foreman and union steward, also are extremely important in establishing a sound base for job evaluation. Loosely conceived job descriptions

may subsequently be challenged in negotiations and require a costly overhaul of the entire program.

Furthermore, the men who are responsible for installing the program must be guided by the principle that it is the job that is being evaluated, not the individual. Any attempt to evaluate volume of work also will result in derailing the program.

Installation Steps—Once a plan has been adopted and tailored to the specific needs of the company, the next step is to introduce and install the program.

Because this is such a highly subjective area, the execution of a successful job evaluation program depends to a great extent on the skillful, persuasive development of internal communications to gain acceptance and understanding.

Supervisors, key employees, and union officials must be sold on the necessity of the program. These people must also be trained to recognize the advantages, disadvantages, and limitations of job evaluation.

A series of training meetings should be held for company supervisors and union representatives to ground them thoroughly on all aspects of the program.

Training Needed—Regardless of how good the program is on paper, it most certainly will fail if the men who implement it are not well trained. Foremen and supervisors particularly should be able to answer any employee questions about the program.

The first training session should cover the broad outline and objectives of the program, the history of job evaluation, and basic concepts such as bench marks, job analysis, and wage administration maintenance.

Subsequent meetings should review the point allocation system, a detailed definition of all terminology, how jobs are evaluated, discussion of the wage curve, and procedures for maintaining the plan.

Pays Off—Although these training sessions take supervisory time, they are a wise investment in the long run in gaining employee support for the plan. Most employees look to their foremen for first hand information about the company and it goes without saying that every worker will be keenly interested in the plan.

Pay Rates Questioned—It can be anticipated that before a job evaluation program ever is installed, the most pressing question by employees will be: Will wage rates be cut? To allay this fear and to obtain employee cooperation, it should be made absolutely clear at the outset that wage rates will not be cut.

The final ingredient for job evaluation success is maintenance which requires continuing top management support.

The wage rate structure is vitally important in constructing an equitable program and should be of management concern on a year-round basis. Too often management is shortsighted in devoting attention to wage rates only at the annual time for negotiation. If wage rates lose alignment, the job evaluation program can be destroyed through lack of maintenance.

Union Question — Management also should be prepared to meet union pressure to spiral wage rates. Especially in the instance of a strong union and a weak management, it often happens that the company will allow a job to be re-evaluated with its attendant upgrading, and the spiraling begins.

The way to forestall the possibility of this situation is to make it clear at a program's inception that in the event of a dispute over the evaluation or re-evalution of a particular job, the bench mark will be the determining factor. Proper indoctrination in the program's early stages is extremely important for this reason.

Periodic Review—Another factor insuring good maintenance is provision for periodic review of the program by the wage and salary man. Whether the review is held quarterly, semi-annually or annually is unimportant, just so it is held regularly. The review should provide for a survey of industry and area rates so that the company is continually abreast of their relative position.

Based on surveys of companies with job evaluation programs, it is clear that job evaluation is firmly established as an important management tool. However, many companies have yet to realize the full potential of their programs.

In the years ahead, development of this new technique will require perceptive management leaders, skilled in the dynamics of human relations, who will work with job evaluation specialists to establish soundly conceived and administered programs.

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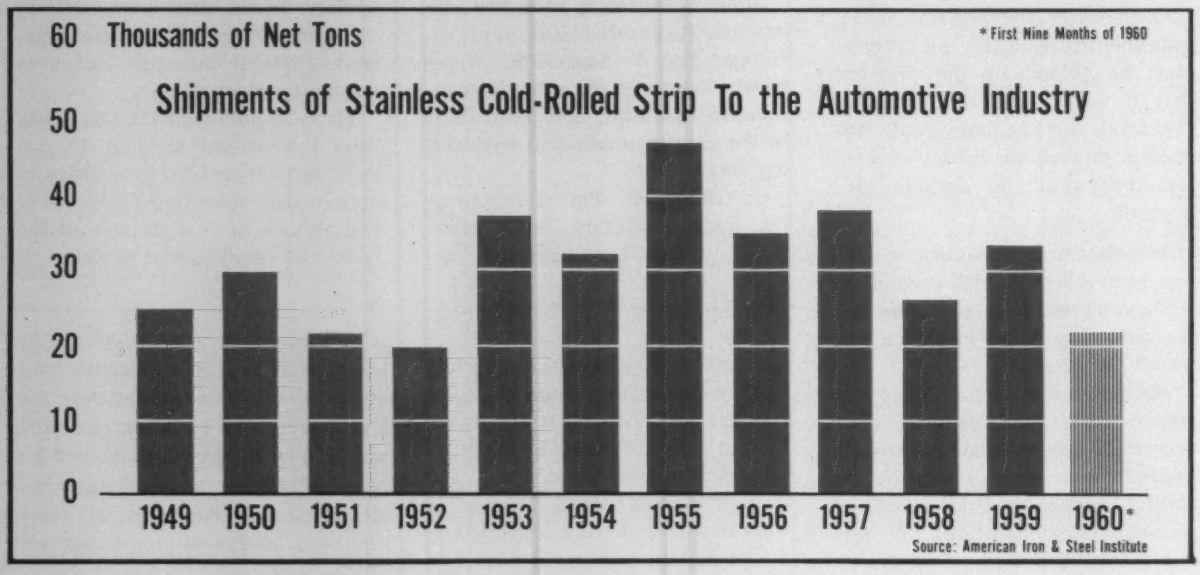
How Mr. Patton Qualifies

John A. Patton is executive vice president, production services, George Fry & Associates. He is widely known in his work in management consulting and particularly in the area of production engineering services.

In 1944, Mr. Patton organized his own consulting firm, which gained national recognition, particularly in the then comparatively unexplored area of labor-management relations on wage incentives and cost reduction.

He is co-author of the text book, "Job Evaluation," used in 45 colleges and universities. In addition to management work both in the U. S. and abroad, he is a director of the Industrial Management Society.

Will Bright Annealing Bring a New Upturn?



Is It Bright Annealed, Or Else?

Automotive demands result in most stainless producers installing bright annealing furnaces.

There's some grumbling, but it could result in new markets for stainless steel products.— By G. J. McManus.

■ Like it or not, stainless steel producers are going to bright annealing of strip that is used for auto trim and other decorative applications.

Six new bright annealing lines are being installed. Two were recently put into service. Existing facilities have been redesigned or reassigned for tonnage bright annealing.

Some Holdouts—There are still a few holdouts but these will give the equivalent of bright annealing. By and large, the stainless industry has embraced, or swallowed, the idea of special annealing for decorative strip.

Behind this swing is the auto industry. General Motors is going to bright annealed 201 stainless for below-the-belt trim on Buick, Oldsmobile and Pontiac models. Other major car builders are favoring the bright annealed product and are applying standards that are tough to meet without bright annealing.

Broad Significance—In responding to these pressures, stainless men have unleashed a program that may reshape entire product and market lines. Use of type 201 stainless by General Motors is a departure from accepted practice; type 430 has normally been used to get the finish required in auto trim. Now, GM says the bright annealing 201 meets all specifications as shipped—without any buffing.

"Bright annealing opens up new potentials for all stainless grades," says J. P. Butterfield, manager of stainless products for Armco Steel Corp.

As an example, Mr. Butterfield points to the use of bright annealed 302 stainless in gas station pumps. Prior to bright annealing, he says, polishing costs worked against stainless in this type of application.

Other Customers — Allegheny Ludlum Steel Corp. reports strong interest from makers of appliances, cookware and other bright finish items. McLouth Steel Corp. is putting in a 52-in. furnace and other producers are thinking beyond automotive strip in specifying widths of annealing units.

However, it is the automotive situation that really brought matters to a head. Bright annealing has been around for years. But, until recently, it was strictly a specialty process. In late 1959, automotive strip was put through a bright annealing line by Wallingford Steel Co., a subsidiary of Allegheny Ludlum.

Good Reception—Wallingford's product was enthusiastically received in Detroit. Auto plants had been pushing for a better combination of brightness and corrosion resistance. By protecting strip with an inert gas during the heating cycle, bright annealing gets away

from the oxidation that is blamed for corrosion problems.

For the same reason, there is no need to remove oxides by pickling. Since pickling dulls the surface of stainless, elimination of this step reduces or eliminates the need for subsequent buffing.

What's Needed—In any case, test shipments established the fact that bright annealing gave auto men the qualities they were seeking. Early this year, tonnage bright annealers were ordered from General Electric Co. for Wallingford and the West Leechburg, Pa. plant of Allegheny Ludlum.

There was no general rush on the part of producers to follow these moves. Nearly all conceded the quality of bright annealed strip but many felt the process could not be applied without excessive costs.

Time for Decision—However, it became clear as the year progressed that time for consideration was running out. The auto companies cracked down in earnest on inspections and there were some mass rejections of conventionally annealed strip. By last month, Allegheny Ludlum's new facilities were in operation. Armco Steel, with a furnace installed in 1958, was offering bright annealed stainless for all decorative applications.

Other producers have now moved. General Electric annealing furnaces are being installed by Sharon Steel Corp., Washington Steel Corp., and the American Steel & Wire Div. of U. S. Steel.

The Electric Furnace Co. is supplying its furnaces to Superior Steel Division (Copperweld Steel Co.), Republic Steel Corp., and McLouth. Armco's 1958 line was built by Electric Furnace. The company is also now supplying a furnace to Metals Control Div., Texas Instrument.

Things to Come—Crucible Steel Co. has not yet ordered a new unit but has overhauled one bright annealing line and has made arrangements for bright annealing of all automotive strip.

Kennedy May Set Up New Agencies

Prospects are strong the new Administration will set up a group of new and powerful regulatory agencies.

Most likely are bureaus representing consumers, transportation, urban affairs, and control of economic aid.
By R. W. Crosby

■ Modernization of the Federal regulatory agency system will probably lead to a bevy of new and powerful departments. And expansion of governmental regulation over business through these new agencies is inevitable.

The departments could usher in a new era including: Governmental representation for the consumer (Dept. of Consumers); a strong national transportation policy (Transportation Dept. or "Ministry"); construction and transportation benefits for large metropolitan areas (Dept. of Urban Affairs); and stringent control of economic aid abroad (Foreign Aid Agency).

In the affairs of all these proposed groups and others, the strong hand of President-elect Kennedy would be very evident. Sen. Kennedy is going to try for unprecedented White House control over the government regulatory system. He now has in his hands a special report recommending sweeping agency changes.

Other Possibilities — Sen. Kennedy will also seek to get more presidental control over existing agencies as well as the new ones. Here are other new departments which may spring up:

A Dept. of Science and Technology, to control policies of the Atomic Energy Commission, the National Science Foundation, the National Bureau of Standards, and the National Aeronautics and Space Administration.

A new banking agency, to raise funds needed by small business investment companies. Rep. Wright Patman (D-Tex.) will introduce a bill to create this agency in the 87th Congress. Congressman Patman feels such a banking group would meet the need of small business concerns for more risk capital.

A Dept. of Mineral Resources, to stimulate and control programs dealing with metallic and nonmetallic minerals, coal, petroleum, and gas. A stronger program within the Dept. of the Interior may preclude this new agency's creation.

An agency to deal with discrimination, particularly the racial question, is being talked about. President-elect Kennedy is thinking about it. If created, it would probably be a part of the Dept. of Health, Education, and Welfare.

Chances for Action — Congress will greet plans for these new agencies with mixed emotions. Many of them, (consumers, urban affairs, transportation, and science), were proposed in the last Congress. They were not approved, but had strong backing. Congressmen seem ready for reforms in the regulatory agencies, but not for presidential control of them. The agencies are now accountable to Congress, and it will not look fondly on any plans to change this congressional power.

Industry will meet the plans for the new departments with even more mixed emotions. The prospect of getting its plans through the government maze with less delay are pleasing to industry. But will it be worth the added control the regulatory agencies will have over industry? The answer appears to be no.

Is Operating Rate Obsolete?

Some steel industry leaders want to stop reporting production as a per cent of capacity.

They claim there are now too many variables for "capacity" to be a useful measure of the industry's health. But others disagree.

By G. F. Sullivan

■ Technological revolution has dealt a nasty blow to what was once the best way to check the health of the steel industry. For years, "steel production as a per cent of capacity" (often called the 'operating rate' or 'ingot rate') was **the** way to take a reading on a company, a steelmaking district—or on the industry as a whole.

This is no longer true. It happens to be the only thermometer in use at the present time; but it is under attack within the industry. It has its supporters too.

Up for Discussion — The "per cent of capacity" problem was on the agenda of a meeting of steel industry executives earlier this week. Their action won't close the case; the controversy will continue for reasons that will shortly become clear.

Four factors have combined to bring this thing to a head:

(1) Past charges that the industry lacked capacity for emergencies (e. g. Korea and the theory of a "guns and butter" economy). This led many companies to leave on their books furnaces whose capacities—on a sheer commercial basis—would have been written off. Furnaces that would have been razed were left standing.

The Big Jump—Part of the industry's 24-million ton climb in capacity from 1950 to 1954 was based on this "defense-standby" theory. Output of 111.6 million tons in 1953 pushed the industry to 94.9 pct of rated capacity. Four years later, in 1957, a 112.7 million ton output meant an operating rate of only 84.5 pct.

(2) The second factor bringing "capacity" into the spotlight was the campaign of President-elect Kennedy. His references to steel operations at 50 pct of capacity were never rebutted by the Republicans—perhaps because of the rather high unemployment in the industry. But at any rate, every time he said it, steel leaders cringed. Privately, they felt that a 100-million ton year was likely. And this, they knew, would make it one of six best production years in history.

(3) Publicity focused on a particularly hard-hit steelmaking area hasn't helped either.

(4) But the problem of "capacity" really gets confusing when you consider the technological breakthroughs of recent years. There was a time when all steelmakers used just about the same practices: Furnace construction, fuel, controls, charging and tapping were quite uniform in most shops.

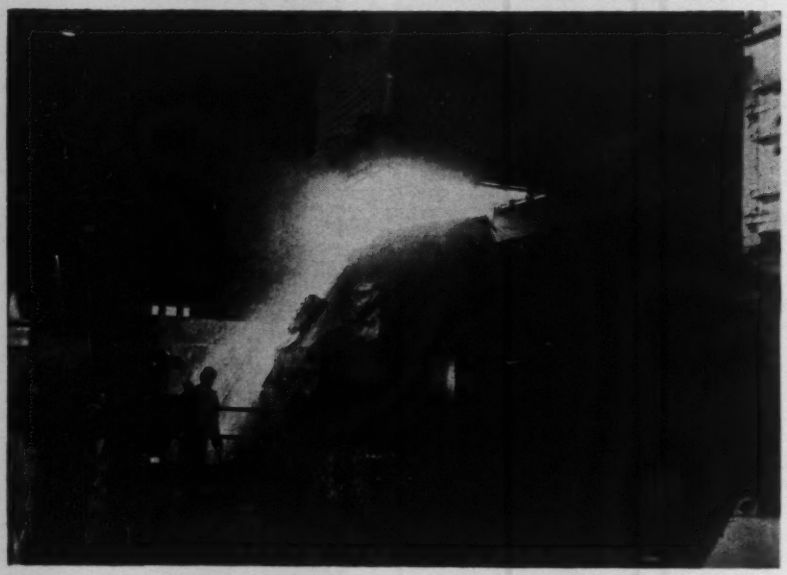
Practices Change—This no longer applies. Gains in blast furnace practice, ore beneficiation, sintering, etc., mean more efficient iron production—hence higher hot metal-to-scrap ratios, which cut heat times.

Openhearth roofs can now be made to last twice as long as they used to, cutting down time sharply.

Enter Oxygen — Probably most important is the upsurge in oxygen use. Not only has it smashed all former concepts of openhearth heat times, it has moved in on its own with oxygen converter.

One plant, for instance, will install two 300-ton basic oxygen converters next year, and idle a 5-furnace openhearth shop. But the openhearths will be on standby, with little hope of their ever being used commercially. Should they be included in capacity?

Somewhat Arbitrary—The "capacity" of a furnace, a shop, or a plant is not something arrived at by multiplying absolute numbers. Some factors are fixed: hours, number of furnaces, etc. Some, like time lost in relining, are somewhat variable; they change with improved technology. But the greatest variable in the equation is net tons per operat-



A FACTOR: Greater use of oxygen in steelmaking, for example, in this Jones & Laughlin oxygen converter, has upset the steel operating rate.

ing hour. This introduces the experience and the judgment of as many people as there are plants; and no two people think exactly alike in an area of changing and expanding technology.

Obsolete? — The steel industry rated its capacity this year at 148.6 million tons. A recent IRON AGE study (IA, Oct 13, p. 50) noted that 5 to 10 million tons of this could be written off as far as commercial availability goes. This would revise the current operating rate upward by a few points.

But it is quite possible that the steel industry of the United States could produce, in 1961, not merely its rated capacity of 148.6 million tons, but at a 170 million-ton-a-year rate without adding a single furnace. That is, if the orders were there in the right products and the price was right.

Too Many Variables? — This leads some steel people to assert that there are now so many imponderables in "capacity" that it is no longer a reliable figure. They'd like to see it abandoned. But their opponents claim either that it is still of some value—or that it can't be pulled out unless something clear and understandable replaces it.

Those who are concerned about capacity as a measure of steel's economic health note that steel stands alone with paperboard in reporting on a "capacity" basis. They ask "What is the rated capacity of the automobile industry?" And the answer is, of course, a deafening silence.

The Other Side—Those who argue for retaining steel capacity figures point out that there is no other simple way to measure one steel company against another, or one area against another. The operating rate is widely used in the press; the American Iron and Steel Institute's effort to de-emphasize it in 1958 failed.

It would seem that if the anti-capacity group is to avoid public criticism, a substitute will have to be found.

Armco Trademark Gets New Look

■ Armco Steel Corp. has modernized its 46-year-old trademark. The new trademark and corporate signature stems from a move toward greater corporate identity at Armco. It will be unveiled to the public through promotion and advertising next month.

Armco president, Logan T. Johnston, says, "The new mark modernizes our 46-year-old inverted triangle, and gives visual expression to Armco's growth during the past 60 years through research, improved operating procedures, and aggressive merchandising."

The company is presently doing better than a $1 billion business annally. In 1959, Armco hired Lippincott & Margulies, Inc., New York industrial designers, for an overall appraisal of the corporation's identification methods. This led to the design of the new trademark.

An Industry Trend—Mr. Johnston notes that there has been a significant trend in the steel industry toward modernizing trademarks to convey redefined corporate and product images.

"But look behind these trademarks, including our own," he says, "and you will find that they actually represent more modern and dynamic expression of what has been going on for some years in steel—a continuing flow of new ideas from research and increasingly aggressive merchandising."

Mr. Johnston feels there is now a higher competition between materials and that it will become even stiffer as steel production increases around the world. He notes, "Aggressive marketing is the thing that will keep our steel industry growing, healthy, and virile."

Has Maintained Symbol—Armco first adopted the inverted triangle as its identity symbol in 1914.

THE NEW LOOK: Logan T. Johnston, president of Armco Steel Corp. (seated), and W. B. Quail, vice president of distribution, study Armco trademarks. The new one, to be unveiled next month, is in the background.

Imports Hit Gray Iron Foundries

Air Pollution Laws Affect the Industry Too

Gray iron foundry executives say imports and air pollution problems are their chief worries.

Nevertheless, some look on 1961 with optimism. Generally, however, the industry looks for profits to drop.

By T. M. Rohan

■ Despite extensive competition from overseas manufacturers, there are some gray iron foundries with high hopes for next year. However, most look for profits to drop.

A group from the United States and Canada met in Cleveland recently for the first management seminar of the Gray Iron Founders Society. Generally, they say, the industry is faced with two problems: Imports and air pollution control.

According to executives attending the seminar, imported vertical motor-pumps, a big foundry market, are arriving in California from England by the hundreds and underselling U. S. types by as much as 30 pct. Motors and soil pipe imports are also heavy.

Displacing Motor Castings—In fact, general purpose motors—copies of U. S. makes—are landing on the West Coast from Japan and underselling American counterparts. They're also displacing motor castings formerly made here. Machined castings are coming in from Italy, delivering for 10 pct under U. S. prices.

Other foundries are losing castings business when their customer companies establish foreign plants. Some have opened foundries in Italy, South America and France. In France, one company is getting its castings for half of the American price.

On the West Coast, too, considerable soil pipe of good quality is coming in from Scotland, South America, Australia, and Mexico. This is also underselling the domestic market.

'Buy American' Policies—However, many water districts in Seattle have adopted "Buy American" policies on equipment such as pipe, pumping apparatus, and controls.

Foundries have additional headaches caused by the problem of air pollution. Fear of the notorious Los Angeles smog is spreading to other coastal cities and many foundries will soon have to install costly air pollution control equipment. The nine-county San Francisco Bay area, for example, has passed a law with a compliance date of July, 1961. Seattle also expects to pass one.

Some cupola capping operations will cost as much as $250,000 and thus use much of next year's capital expenditures.

Still Optimistic—Yet there are foundrymen with optimistic outlooks for 1961. Some have firm orders through March and April. One even has a firm order through June.

However, members attending the seminar undoubtedly reflect the more optimistic viewpoint. Most are operating a full week and some are even going on two shifts.

Overall, gray iron casting shipments in the U. S. this year are expected to be right around 12 million tons, according to GIFS. Next year a slight increase to 12.5 million tons is anticipated. Shipments in 1959 were 12.3 million tons.

Which Areas Show Activity?

A spot regional survey of executives attending the first management seminar of the Gray Iron Founders Society in Cleveland reveals that business is weakest along the West Coast, in upstate New York and in the Chicago area. Some capsule surveys are:

Philadelphia—Some nine shipbuilding orders up to $35 million have recently come into the area. This means good castings business for nearby outfits.

New England — Numerous pattern changes indicate much redesigning and new products. However, the machine tool activity is still slow and this affects castings demand.

San Francisco — Air pollution control laws will mean less capital expenditures.

Indiana—Business can be termed "fair." Indications are that it won't get worse, and it is moving "as well as can be expected."

Buffalo — Castings demand is hurt by a lack of machine tool business. However, some special food industry machinery is "going great guns."

Atlanta — Indications are that 1960 will be the industry's best year yet in this area. Textile plants, marble quarries and farm equipment makers are coming through with good orders.

Chicago—Business is spotty, but there are hopes of improvement. The packaging industry, large users of castings, is active.

Wisconsin and Minnesota—Business here is probably in a little better shape than most other areas. Foundries are working full weeks and shipping "respectable tonnages."

Michigan — Foundries here are going five days a week with two shifts and expect to continue this pace. Backlogs are about 90 days.

IN THE FIELD: Welding machine developed by Aluminium Ltd. for fast welding in the field is a factor in booming sales of aluminum pipe. It can weld 150 joints of 4-in. pipe in a day.

Aluminum Pipe: It's Ready to Go

Producers of aluminum pipe are convinced it will start to realize its potential in 1961.

They expect sales to at least double in the coming year, and some believe they may do even more.

By F. J. Starin

■ Aluminum producers have been predicting a bright future for their pipe since the first major sales to the oil and gas industry less than five years ago. But never have they been as optimistic as they are for 1961.

For permanent oil and gas installations, annual sales of aluminum pipe have never hit 1 million lb.

Yet, William Moore, Reynolds Metals Co. sales specialist in this market, expects sales for permanent oil and gas lines in 1961 to hit at least 2 million lb. And if activity in foreign fields picks up as Mr. Moore believes, this figure could hit 10 million lb. Sales for temporary installations in oil fields will add 3 to 5 million lb next year.

Sales Goal—At Aluminium Ltd., the major Canadian producer, opinions vary—but only in degree of optimism. One executive expects aluminum pipe sales in Canada to be about 5 million lb in 1961, more than double 1960.

A pipe salesman says the company will more than double its sales. He suggests the increase might be as high as 700 pct.

But aluminum spokesmen caution that even this boom would still put aluminum at only a small fraction of steel pipe sales. The goal of Aluminium Ltd. is 5 to 15 pct of the total pipe market. A representative of a U. S. producer suggests something slightly under 10 pct of the market is the maximum for aluminum. A spokesman for another company sees the potential as 50 to 100 million lb annually.

Behind the Boom—What is causing this upcoming boom in aluminum?

Experts at Aluminium Ltd. say pipeline companies have become more familiar with aluminum. And there are the basic advantages of aluminum: Corrosion resistance and lighter weight.

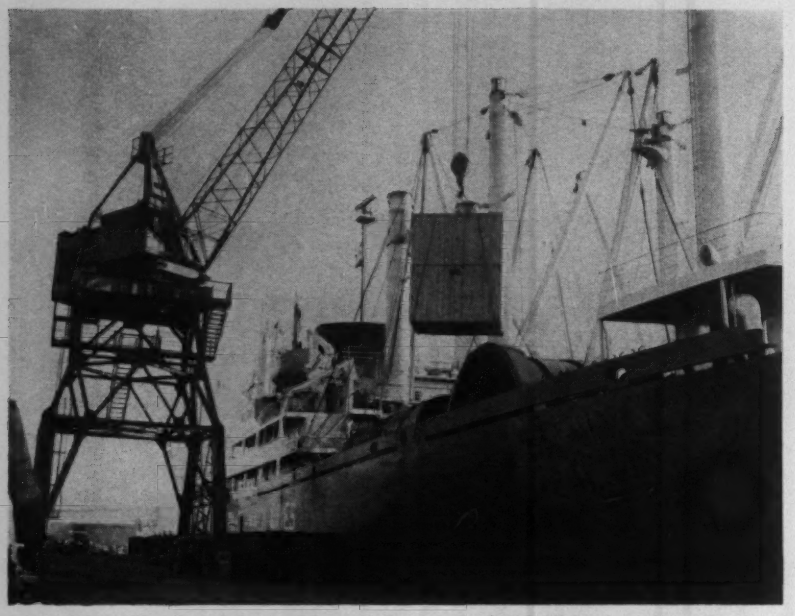
Aluminium Ltd. opened its files for a case history. A large Canadian oil field contractor had kept tabs on the relative handling costs to pickup and lay one mile each of 4-in. steel and aluminum pipe. For steel the contractor required 121.48 manhours at a cost of $263.90; aluminum required 20.4 manhours at a cost of $44.07.

A spokesman for a U. S. producer of steel pipe claims that, foot-for-foot, steel is still about 30 pct less expensive than aluminum when all factors are considered—not just handling.

No Concession—Naturally, Aluminium Ltd. doesn't concede this. It contends there is less friction in an aluminum pipe. Therefore, one size smaller can be used. Corrosion, it says, isn't as much of a problem as with steel, so smaller wall thicknesses are possible.

The ease of welding aluminum is claimed as another factor. The Canadian aluminum producer has developed an automatic welding machine which it says can weld 150 joints on 4-in. diameter, 3/16-in.-wall pipe per working day. The crew needed is only a semi-experienced welder and helper, plus pipe handlers.

Tooling for Trucks Heads for Argentina



BIG ORDER: Special machine tools worth $500,000, from the F. Jos. Lamb Co., Detroit, are shown being loaded for shipment via the St. Lawrence Seaway to Ford Motor Co.'s truck plant in Argentina.

Ghana Aluminum Faces Hurdles

Nearly $178 million worth of problems will have to be solved before the Volta Aluminum Co. Ltd. begins producing aluminum in Ghana. And financial headaches are magnified further by political undertones.

Valco was formed by a consortium of major American and Canadian aluminum producers. Included in the group are: Kaiser Aluminum and Chemical Corp., Aluminum Co. of America, Reynolds Metal Co., Olin-Mathieson Chemical Corp., and Aluminum Ltd., Canada's chief producer.

The problems became a reality—with a deadline—on Nov. 17 when Edgar F. Kaiser, chairman of Kaiser Aluminum, signed an agreement with Ghanian officials in Accra.

A 1966 Deadline—In a nutshell, the agreement is this: Valco will raise $178 million to build an aluminum smelter. The Ghana Government will supply the power for the smelter by building a $168 million dam on the Volta River. The agreement also calls for the production of nearly 180,000 long tons annually before 1966.

Though it has been signed and both parties are working on the financing, the agreement must still be ratified by the Ghanian Parliament.

The African nation offers the consortium a good supply of hydroelectric power from the Volta River and large supplies of bauxite ore from which aluminum can be extracted if the power is available. On the other hand, Ghana, whose economy is chiefly agricultural, could receive the needed push from the smelter in the direction of an industrial revolution.

The Big Hurdle—Mr. Kaiser says financing is definitely the major bar to the project. However, just how big this problem is remains to be seen.

Valco says it is willing to undertake any business risks, but not the "non-business" chances. Wallace L. Rice, a Reynolds vice president, notes, "The project will depend on an effective guarantee against all political risks by a suitable agency of the U. S. Government."

The group fully realizes that potential backers consider the possibilities of expropriation or war before putting money on the line. Backers also remember that Ghana appeared to side with Russia and Cuba on some issues in recent United Nations sessions.

Washington, meanwhile, says the consortium cannot demand U. S. guarantees. It can, however, turn to such agencies as the International Cooperation Administration or the Development Loan Fund of the State Dept.

New Furnace Expected

A low frequency induction furnace, capable of producing stainless steel, will soon be offered to the U. S. market. The channel-type furnace, available in at least two models, will be sold by De Prato Manufacturing Co. under license from Calamari & Co., Milan, Italy.

The furnace is said to produce temperatures up to 3250°F., and will be offered for the melting of stainless, gray iron, aluminum, malleable and ductile iron, and a number of other nonferrous metals.

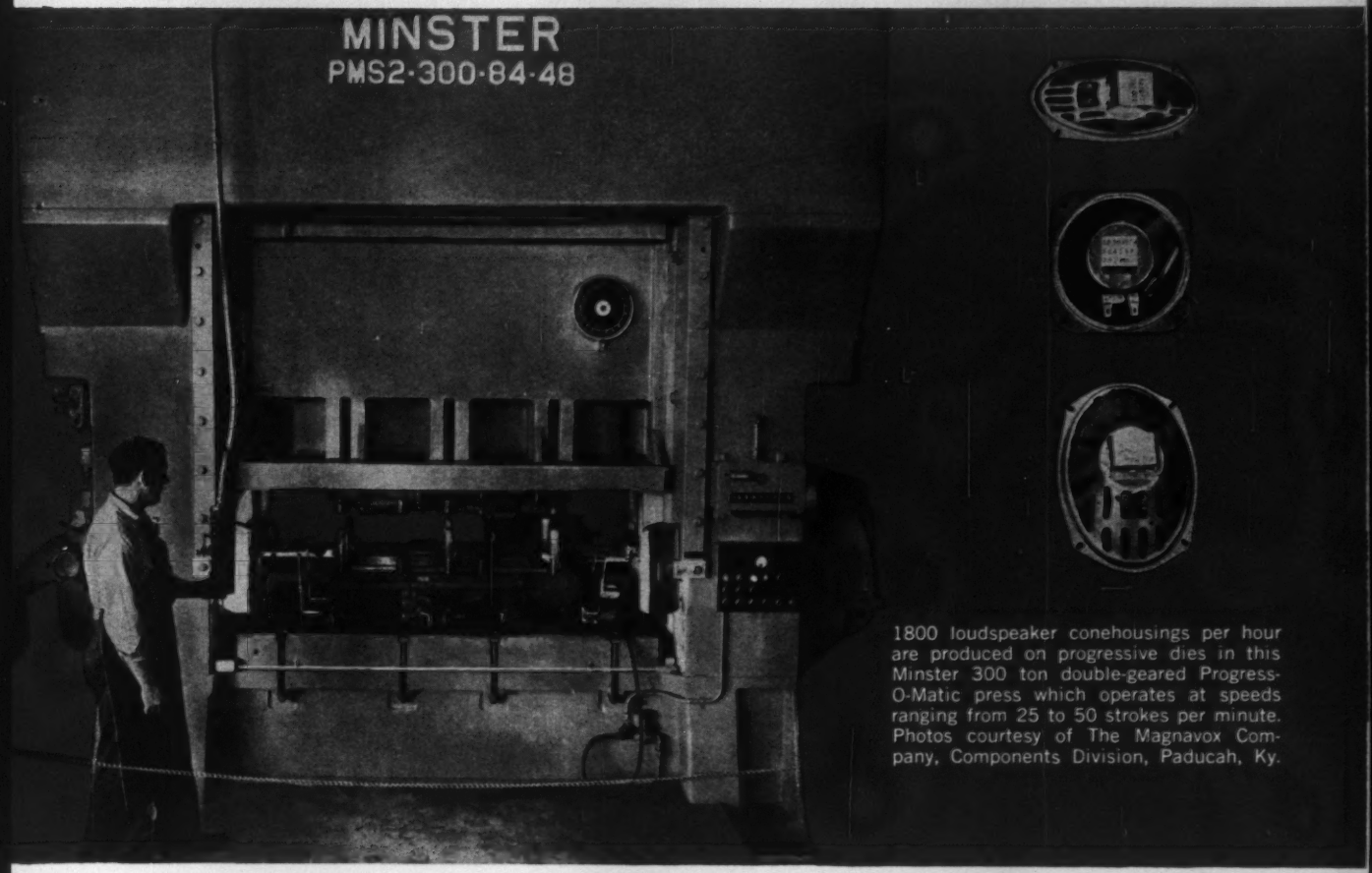
It will be offered in a three-phase model, adaptable as single phase. Water-cooled primary coils and water cooling for at least parts of the refractory system will be included in the model.

"Atlantic Union" Pact Advanced

Talk of an economic and defense confederation of the U. S., Canada, Great Britain, and Western Europe is being greeted by raised eyebrows of U. S. congressmen.

Some congressmen express a distrust of an "Atlantic union" to tie the U. S. even closer to its allies. They say such a pact would hurt U. S. autonomy and would saddle the U. S. with more bills for foreign affairs.

AUTOMATIC PRODUCTION reduces costs...savings pay for the press



1800 loudspeaker conehousings per hour are produced on progressive dies in this Minster 300 ton double-geared Progress-O-Matic press which operates at speeds ranging from 25 to 50 strokes per minute. Photos courtesy of The Magnavox Company, Components Division, Paducah, Ky.

For Magnavox . . . this MINSTER Progress-O-Matic Press

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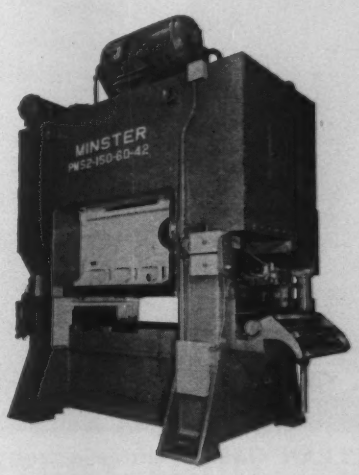

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INDUSTRIAL BRIEFS

Wire Service—National-Standard Co., Niles, Mich., has expanded its capacity for producing stainless steel wire by 25 pct. The increased capacity was made possible by new equipment installed at the company's Niles and Worcester, Mass., plants.

Hot Project — General Electric Co., in conjunction with seven New York state utilities, will build an $8 million superheat development reactor. It is to help extend the technology of nuclear superheat for eventual application to large-scale nuclear power plants. The reactor will be designed, built, and owned by GE's Atomic Power Equipment Dept. at its Vallecitos Atomic Lab near Pleasanton, Calif. It will be ready for operation in 1962.

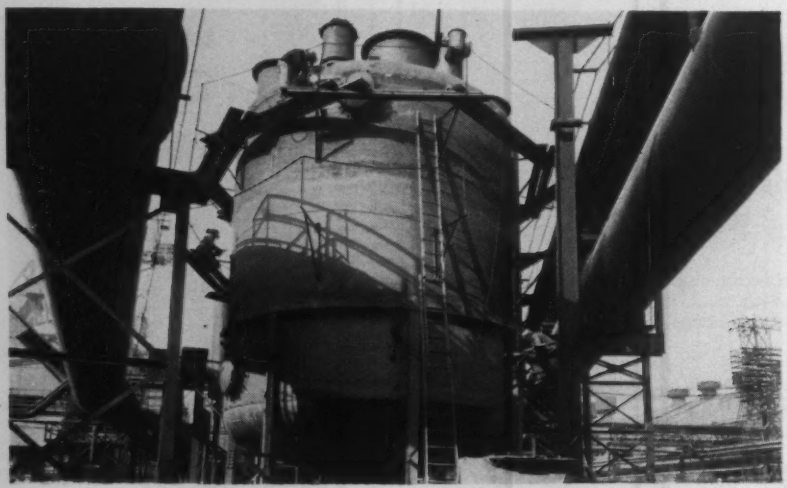
Color Line—Highly mechanized and automated production lines for coloring pre-engineered steel building components are being installed at National Steel Corp.'s Stran-Steel Div. plant at Terre Haute, Ind. The project, underway 15 months, will be completed by the end of the year.

Canadian Budd — The name of The Budd Company's Canadian subsidiary has been changed from Tatnall Measuring & Nuclear Systems Ltd. to Budd Instruments Ltd. The Canadian offices have been moved from 46 Hollinger Rd., Toronto, to 170 Donway West, Don Mills, Ontario.

Near Beaches and Peaches—Two brand new metals and building products distribution centers were opened this month by Reynolds Aluminum Supply Co. In Jacksonville, Fla., the new 40,000 sq ft plant replaces the plant on E. Eighth St. In Atlanta, new facilities provide some 50,000 additional sq ft which will be occupied entirely by the Warehouse Division's Atlanta Branch.

Sound Contract—A Navy contract in excess of $3 million for anti-submarine warfare sonar equipment has been awarded The Bendix Corp.'s Bendix-Pacific Div. The sonar transducer system, officially termed SQS-23, was originally developed in 1957 by Bendix-Pacific. Additional systems ordered by the Bureau of Ships will be used aboard surface vessels in ASW work.

Work Progresses on Huge Gas Scrubber



CLEAN GAS: Electrostatic precipitator, being built at Bethlehem Steel Co.'s Lackawanna, N. Y., plant, will clean 7 million cu ft of gas per hour. Gas will be used to heat soaking pits for new slabbing mill.

Dow Bows Out—Dow Chemical Co. plans to close the Die Casting Dept. of its Bay City, Mich. plant. The termination will withdraw Dow from competition with other die-casters who are its customers for magnesium diecasting ingot. With the establishment of a $400,000 customer service lab for die casters by Dow's Magnesium Sales Dept., the Bay City operation will no longer be needed for development and pilot plant work. The new lab, located in Midland, Mich. is scheduled to open in January.

Really Clean — The Cleveland Foundry, Ford Motor Co. plans to install a new air pollution control system. The new dust collection system will be in operation by next fall. It will be built by American Wheelabrator Corp., Mishawaka, Ind., and will have a capacity of 650,000 cu ft per min. or 50 pct more than that of the electrostatic precipitator system which it replaces.

Anniversary Announcements — Eutectic Welding Alloys Corp. plans to build a $2.5 million metallurgical plant and research center at its Flushing, N. Y. headquarters. Plans announced recently at Eutectic's 20th anniversary luncheon in New York, call for work to start in 1962. New metalworking industry products were also introduced at the luncheon including: An electrode for chamfering, grooving, and similar operations which can operate on AC and DC; and a new chemical paste compound for removal of metal oxide films.

Home Base—Lake Shore, Inc., has established a new office for its contracting and Parts Div. at 626 E. Wisconsin Ave., Milwaukee. The office will serve southern Wisconsin and northern Illinois, including Chicago. This division is responsible for manufacturing and marketing base and surface plates, synamometer bases, engine jacks and stands, automotive parts and portable conveyors.

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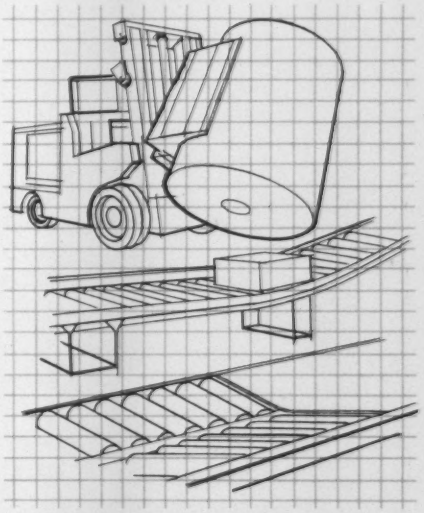

Model illustrated built to 3.5 mm scale.

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Depreciation Reform Needed

Caught between declining profits and the need to modernize, industry is pushing for improved depreciation allowances.

Many businessmen would be willing to give up capital gains on depreciable property sales if they got a more adequate depreciation system.

■ Most businessmen want depreciation reform—even if it means giving up some capital gains tax advantages. And, if the U. S. liberalizes depreciation allowances, they are ready to step up capital spending.

These are the opinions of businessmen surveyed by the Research Institute of America. They are based on replies from the group's 30,000 members who represent a sample of businessmen across the country.

Valuable Views—The questionnaire used was identical with one sent out earlier by the U. S. Treasury and the Small Business Administration. Both surveys are aimed at uncovering industry's beliefs about depreciation. A preliminary report on the Treasury's survey is due later this month.

How business feels, of course, won't necessarily influence Treasury recommendations on any tax changes next year. But both the Treasury and Congressional tax-writing committees are interested in the views expressed.

Hot Issue—There's much steam behind industry's bid for more liberal depreciation allowances. Right now it's spurred by two harsh economic facts, each working against the other: Lower profit margins and the need to modernize and cut costs.

Slow sales, increased competition, and price cutting are trimming industrial earnings. This, in turn, leaves less money for capital improvement. And, without improved equipment and better methods, industry will have trouble holding down costs, stimulating sales, and improving earnings.

Not Satisfactory—This being the case, the strong interest in more liberal depreciation is understandable. In fact, five of every nine companies answering the Research Institute's survey said present depreciation allowances are not satisfactory.

They maintain inadequate depreciation is the fault of inflation and "useful lives for tax purposes being too long."

What's more, the majority are willing to give up capital gains treatment of depreciable property sales in return for "a more adequate depreciation system."

What They'd Like—The system most would like is one giving each company freedom to set its own schedule of years for depreciating plant and facilities. They agree, however, that such systems should be on a consistent basis and not changed at will.

Industry Banks On R&D

■ Looking for ways to increase sales with better products and improved methods, industry continues putting more dollars into research and development.

How much spending is increasing for R&D is shown in two new National Science Foundation reports. Last year private industry spent $9.4 billion for research and development—a 15 pct increase over 1958's spending.

Big Spenders — Industrial R&D spending for 1960 is expected to reach $10 billion, for a somewhat smaller increase (8 pct) than that from '58 to '59. Among the largest spenders were aircraft and parts ($2.9 million), and electrical equipment and communication ($2.2 million.)

. . . And More Workers—Also reflecting the same trend is increased employment of scientists and engineers in industry.

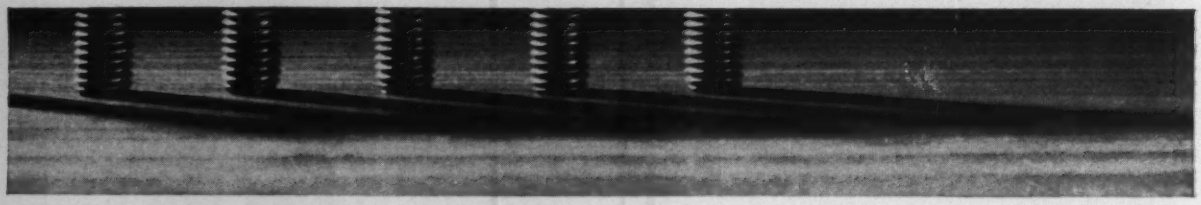
Seasonal Note

The Christmas holidays are having their usual seasonal effect on business.

Statistics released by The Associated Industries, Cleveland are typical of the trend. Almost every worker there will get Christmas and New Year's Day off. But quite a few also get time off for shopping.

Among 212 companies surveyed, 34 will give office workers time off for shopping. Forty-two will give factory workers time off.

Heads for $50 saving per unit



Fastener survey of blower units by RB&W points out where use of standard hex screws cuts costs, but not quality

In making a survey of a well-known manufacturer's fastening operations, the RB&W man found that alloy socket head screws were used extensively in large blower units.

But he found no genuine engineering need – the alloy's strength wasn't being utilized. And he found no production need – there was no tight spacing situation that required internal wrenching. Nor was there even an *appearance* need – screws weren't being installed in countersunk holes for a flush fit.

So there was no purchasing need, either. Why pay the premium cost for alloy fasteners? He recommended switching to *standard* high strength hex screws. The savings in fasteners per blower: 50 dollars. That's 50 dollars added to unit *profit* with no increase in price.

An RB&W Fastener Expert is no better than your engineers. He simply knows *what* to look for. Why not let him search for savings with one of *your* engineers? Maybe you're doing the best possible; but unless you're sure you're not wasting fastener dollars, it pays to consult Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

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Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Sales office and warehouse at:** San Francisco, Calif. **Sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas. **Sales agents at:** Cleveland; Milwaukee; New Orleans; Denver; Fargo. **Distributors coast to coast.**

Automakers Put Accent on Youth

Executive Shuffles Move Young Men up the Ladder

There have been numerous appointments to key positions in the auto industry in recent weeks.

And in the majority of cases, the men are in their 40's.

By A. E. Fleming

■ As the auto industry prepares for the next decade, it seems clear that the strong, young men of the trade are being called on to lead the way.

Last week, the name of Lynn A. Townsend emerged prominently from the roster of Chrysler Corp. officials. As administrative vice president, he becomes second in command.

American Motors—A week before Mr. Townsend's appointment, there was a major realignment at American Motors Corp.

The company did away with its divisional structure. Its automotive and appliance groups were fused into a single unit.

Rising to greater prominence were Roy Abernathy, R. D. Chapin, Jr., and B. A. Chapman.

Ford Moves—Not more than a month ago, R. S. McNamara became the fifth president of Ford Motor Co. since its founding in 1903. Mr. McNamara's appointment has been accompanied by the birth of a new automotive assembly division and a series of promotions:

J. O. Wright, as vice president and group executive of car and truck divisions; L. A. Iacocca, as vice president and general manager of Ford Div.; C. R. Beacham, as head of a new central staff post with the title vice president of marketing; and D. J. Bracken as chief of the new assembly division.

Youth Movement—In September, Studebaker-Packard Corp. took a step to strengthen its industrial position by bringing Clarence Francis out of retirement to lead a movement of expansion and diversification.

There have been other moves in the automotive world in the past few weeks. At Chrysler, B. J. Nichols succeeded M. C. Patterson as head of the rising Dodge Div.

Young Men—Practically all of the new leaders are in their 40's. Chrysler's Mr. Townsend is 41. Dodge Div.'s Mr. Nichols is 47.

At 54, Mr. Abernathy, now executive vice president in charge of distributing and manufacturing all cars and appliances, is oldest of the American Motors trio. Mr. Chapin, head of fiscal and international operations, is 45. Mr. Chapman, responsible for directing manufacturing, engineering, styling and procuring operations, is 52.

Ford president McNamara is 44, a year older than board chairman Henry Ford II. Mr. Wright is 48, Mr. Iacocca is 36, Mr. Bracken is 49, and Mr. Beacham is 60.

Comfort Comes From a "Torture" Machine

IRON MAIDEN: Despite resemblance to a Medieval torture press, this is a cast aluminum mold in which foam rubber automobile seat cushions are formed at Goodyear Tire & Rubber Co.'s Akron plant.

who cares about the core . . . *as long as the rest tastes good? This viewpoint can't be shared by users of stainless or high temperature alloys or tool steels. For production men who know anything about steelmaking . . . recognize that weak structure or poor composition at the core of an ingot can mean trouble with every piece of steel that comes from it. It can result in higher rejection rates, premature part failure, shortened tool and die life, increased production costs, and dissatisfied customers.*

That's why we say the exclusive MEL-TROL® process goes a step beyond quality control. It includes a new, patented ingot mold which controls the freezing process . . . forces impurities to the top where they can be cut off and discarded. This MEL-TROL ingot is more uniform . . . freer from segregation. You get clean, sound, tough metal from core to surface in every lot of steel you order. Use MEL-TROL Specialty Steels and enjoy the luxury of saying: "No problems . . . never a thought about cores!"

Carpenter steel

you can do it ***consistently*** better with Carpenter Specialty Steels for specialists

The Carpenter Steel Company, Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

Defense Emphasis Affects Jobs

More Workers Are Needed for Aircraft Than Missiles

When the Defense Dept. changes its thinking, it can very well affect Farwest employment.

It takes less workers, for example, in missile plants than it does to build aircraft.

By R. R. Kay

■ What's ahead for California companies tied to defense work? This is a top question on the West Coast.

Even slight shifts in national defense spending have a big effect on Farwest economy. In California, for example, one out of every three plant workers is in defense.

In the past 12 months, 42,000 California aircraft-plant workers were laid off. Some 60 pct of them, however, got jobs in two other defense industries: Electrical equipment, including electronics, and ordnance.

Painful But Past—Several years ago the aerospace industry began a full scale transition from manned aircraft to missiles. It was painful, but the worst of it is now over.

The Kennedy Administration is bound to step up defense spending. There's a new urgency about it in light of the current Russian talk.

Most Pentagon planners say that missiles alone aren't the answer. So now there's renewed interest in manned aircraft. The government has reinstated the program to develop a weapon system around the 2000-mph B-70 bomber.

A $2 Billion Project — North American Aviation Corp., the prime contractor, says this project will involve 8000 suppliers throughout the country. The estimate is that the first wing of 62 aircraft will cost over $2 billion.

There's also a good chance that in fiscal year 1962, the Minuteman inter-continental ballistic missile program will get as much as another $1 billion.

As long as the cold war is active, the Coast's defense complex will get a good share of the military dollar. But there'll be fewer job openings. It takes fewer workers to make missiles than aircraft.

Navy Ships Work West

More shipbuilding work is slated for the Pacific Northwest. The Navy will spend $29 million there to construct two guided missile destroyers.

These will be sister ships of two others that Todd Shipyards, Seattle, is now building.

It's Simulated Stimuli

A Spacearium will be a feature of the Century 21 Exposition in Seattle in 1962. It's billed as a "spectacular trip through space." A make-believe voyage will give close-ups of the moon, earth, and planets.

Sponsors of the attraction are the government's U. S. Science Exhibit and Boeing Airplane Co.

Steel from the Sands of the Desert?

BLACK SAND: Newly-formed Arkota Steel Co., Coolidge, Ariz., expects to begin producing high grade iron and steel from Arizona Black Sand deposits by next spring. The sand contains 5-15 pct recoverable iron which will be processed through the Madras Ore Reduction and Steel Making Process. The company is the first U. S. licensee of the process.

Bevel and Square Edge Shearing

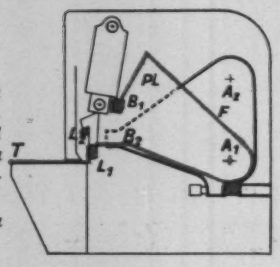
1 operation

with Corpet-Louvet hydraulic shear

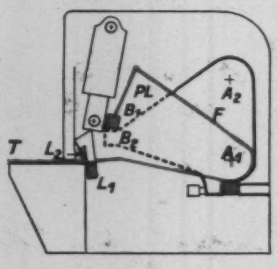
Two Blades are mounted on the blade holder PL. L^1 is for straight cut, L^2 for bevel cut.

During the straight shearing operation PL rotates around the ball and socket joint A^1 of end-bearing plate F.

L^1 shears straight into Sheet T.



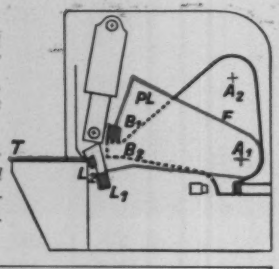
At the end of the straight shearing, thrust B^1 mounted on the blade holder PL meets thrust B^2 mounted on end-bearing plate F.



Blade holder PL and end-bearing plate F have become solid, rotate around joint A^2 of the frame.

L^2 then bevel shears.

Both square cut and bevel cut are completed in one stroke.



A MACHINE TOOL THAT DOUBLES ITS USEFULNESS IS WORTHY OF YOUR INVESTIGATION

1 time saving

a. Square cut or square and bevel cut in one stroke.

b. Perfect, clean bevels—ready for subsequent welding operations.

2 rapid—easy adjustment

a. (2) thrust screws with vernier dials and rapid lock, set and maintain square cut blade clearances.

b. (2) additional screws and vernier scales adjust clearance between bevel cut and stationary blade to permit full or partial bevel.

c. Motorized back gage with direct reading dials.

d. Optional light beam projectors permit accurate angle shearing to layout line.

3 simplified maintenance

a. All hydraulic—eliminating maintenance on gears, clutches and belts.

b. Preset—relief valve prevents damage from overloading.

c. Swivel-ram action eliminates slides—self-clearing action prolongs blade life.

d. Preset, multi-piston, variable-volume, variable-pressure hydraulic pump automatically adjusts to pressure required for plate thickness being cut.

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Division of McKay Machine Co.

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Air Force Spurs Modernization

Asks Industry to Update Production Equipment

Private talks of government production experts with aerospace contractors, tool and equipment suppliers reflect new urgency.

Don't expect yesterday's—or even today's—tools to make tomorrow's weapons, they say.

By R. H. Eshelman

■ For some time, farsighted individuals in technical management and government have been alarmed by the growing obsolescence of production equipment in the metalworking industries. Numerous surveys (long before the election furor) pinpointed the growing gap between America's plant facilities and manufacturing technology.

One of the few organizations still battling to do something about it is the Air Force. Its long-range modernization program began back in 1956. It's been moving ahead gradually. Now it's shifting into high gear. Impact of new aerospace weapons systems is staggering. Design is leapfrogging into the future. Fabrication costs are skyrocketing.

A B-36 bomber (World War II-type) cost $4 million; a modern bomber such as the B-58 goes over $20 million. Missiles, space projects, and nuclear subs follow the same pattern.

Modernization Message — Key Air Force people such as Fred Hill, chairman of the modernization program, and his associates have hit the sawdust trail. They are meeting the military contractors, suppliers, machine tool executives and equipment suppliers all over the country.

Reduced to barest essentials their message is: Huge cost of weapons systems must be pared; dramatic savings are possible through advances in machine technology; continued modernization and replacement is the only means to protect the government tool inventory from becoming outmoded.

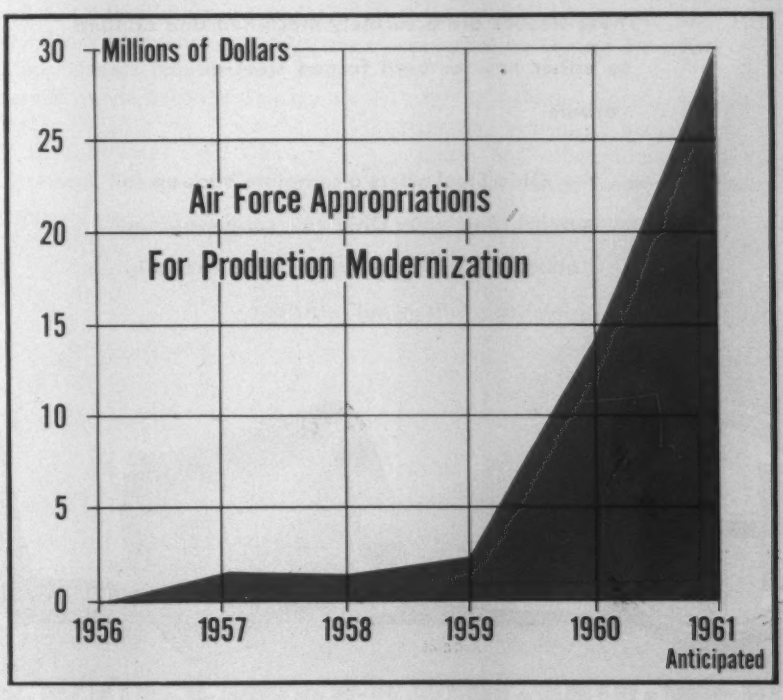
Look Ahead—But most vital of all, materials and configurations of tomorrow's weapons cannot be fabricated efficiently (and some, not all) with today's equipment.

Air Force production authorities document the case with charts, graphs and compelling logic. Further, they are prepared to back it with money—some $15 million in 1960. They have tentative approval for $30 million more in 1961.

Money Where Needed—This is no grab bag program. Money will go where most needed in aerospace weapons output. Each new piece of equipment must be as carefully justified as in private industry—in terms of payoff, present and proposed methods and other back-up data. But the group is prepared to lend a hand to vital projects.

In turn, it's apparent that the Air Force expects industry to help itself in keeping abreast of manufacturing advances. One of the problems cited by government spokesmen is need for greater recognition by company managements of recent improvements in machines and manufacturing methods.

A.F. Spending to Upgrade Tools

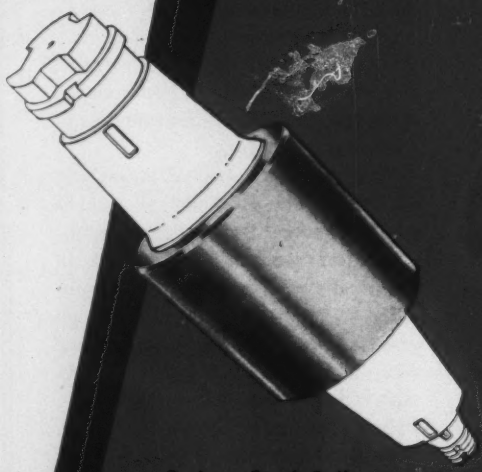


Now Ohio offers FORGED SLEEVES for back-up rolls

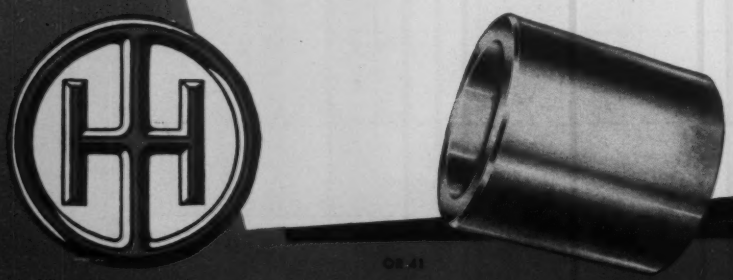
Ohio Steel—specialists in manufacturing all types of iron, steel and forged steel rolls—now offers the rolling mill industry *a superior forged steel sleeve for back-up rolls.*

Ohio back-up roll body sleeves are forged and hardened from *balanced alloy vacuum poured degassed steel.* These sleeves are accurately machined and applied to either new or used forged steel or cast steel arbors.

Yes, Ohio Steel offers a complete back-up roll service. Ask your Ohio roll sales engineer about this modern facility that can help increase rolling mill efficiency.



- Carbon Steel Rolls
- Ohioloy Rolls
- Ohioloy "K" Rolls
- Flintuff Rolls
- Double-Pour Rolls
- Chilled Iron Rolls
- Dense Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nicloy Rolls
- Forged Steel Rolls



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PLANTS AT LIMA AND SPRINGFIELD, OHIO... *Virtually at the center of the steel industry*

F. L. Riggin, Jr., elected president and chief executive officer, Mueller Brass Co., Port Huron, Mich. He succeeds **F. L. Riggin, Sr.,** who has been elected chairman of the board.

American Motors Corp.—**R. D. Chapin, Jr.,** executive vice president and general manager, Automotive Div., will be executive vice president, fiscal and international activities in the automobile and appliance fields; **B. A. Chapman,** executive vice president and general manager, Appliance Div., will be executive vice president, all automotive and appliance manufacturing, engineering, styling and procurement; **R. A. Abernethey,** vice president, distribution and marketing—automotive, elected executive vice president, automobile and appliance distribution and marketing; **J. W. Raisbeck,** elected vice president, sales operations; **R. T. Purdy,** elected vice president and treasurer; **J. W. Eskridge,** vice president and general manager, Special Products Div., continues as vice president, defense production, with added duties of future product development for all corporation product lines. He also heads the corporation's acquisition committee.

United-Greenfield Corp.—**E. W. Zipse,** elected president and chief executive officer; **J. C. Mulugen,** elected executive vice president.

The Budd Co.—**P. W. Scott,** elected executive vice president and a member of the board.

Fairbanks, Morse & Co.—**B. R. Eng,** named treasurer; **B. A. Feuerstein,** appointed company secretary and general attorney; **R. E. Isaacson,** named controller; **C. E. Clausen,** appointed vice president, Scale Div., Fair Lawn, N. J.

Whiting Corp.—**T. R. Elmblad** and **A. C. Kukral,** named manager, New York Domestic and Cleveland sales offices, respectively; **R. J. Enroth,** moves from the Chicago office to New York Domestic and **F. R. Schwantes** from Chicago to Cleveland.

E. H. Perkins, Jr., named executive vice president and general manager, Brooks & Perkins, Inc.

Air Reduction Sales Co.—**A. S. Blodget, Jr.,** appointed midwestern regional vice president.

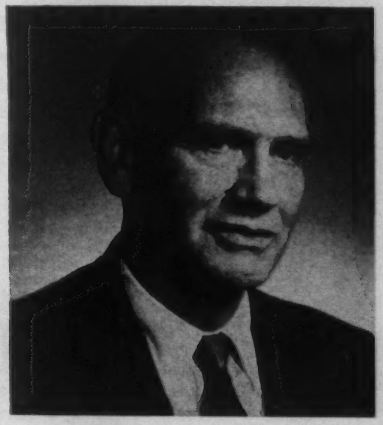
Vickers Inc., Div. of Sperry Rand Corp. — **D. L. Heisler,** appointed director, purchasing.

Peter A. Frasse & Co., Inc.—**J. M. Dehn** and **T. W. Sill, Jr.,** appointed marketing managers.

L. B. Foster Co. — **Michael Darkoch,** appointed manager, operations and office administration, Pittsburgh office; **Andrew Dorish,**

W. T. Haswell, Jr., named vice president, production, Latrobe Steel Co.

G. R. Milne, named president, Air Reduction Chemical & Carbide Co., Div. of Air Reduction Co., Inc.



E. L. Ludvigsen, elected vice president - administrative, Eaton Manufacturing Co.

named plant superintendent, Carnegie facility.

Arcos Corp.—**R. W. Anderson,** appointed New England district sales manager.

Albion Div., McGraw - Edison Co.—**Lacy Blake,** appointed Southwestern regional manager.

Fairmont Aluminum Co.—**P. E. Jones,** appointed manager, Chicago sales district.

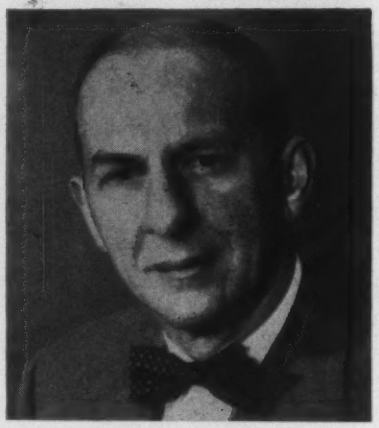
General Electric Co.—**Marshall Anderson,** appointed manager, manufacturing, General Purpose Control Dept., Bloomington, Ill.

Allison-Campbell Div., American Chain & Cable Co., Inc.—**G. W. Herman,** appointed manager, Allison abrasive wheel plant.

Metal Products Div., Koppers Co., Inc.—**Pierce Hollingsworth,** appointed manager, Industrial Gas Cleaning Dept.

U. S. Steel Corp.—**E. W. Backes,** named director, trade relations.

Flotronics Div., Selas Corp. of America—**G. V. Jordan, Jr.,** named manager.



P. E. Minsel, appointed general manager, Fuller Manufacturing Co., Kalamazoo, Mich.

Lockhart Iron & Steel Co.—**J. E. Wolf,** appointed manager, aluminum sales.

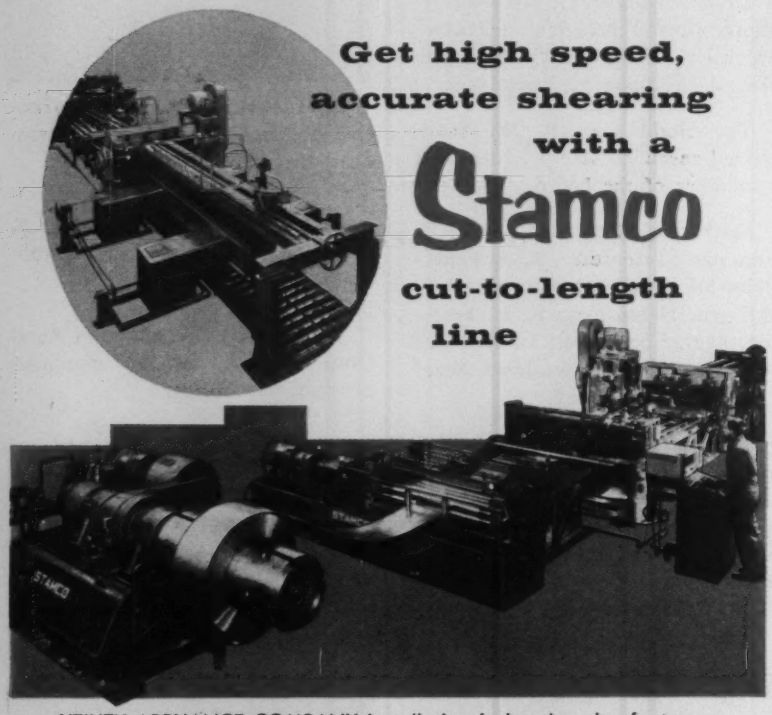
The Mueller Brass Co.—**Alden Hense,** appointed works manager.

Lockheed Electronics Co. — **D. M. Halliday,** named director, industrial relations.

J. A. Marohn, named financial vice president, Acme Steel Co., Chicago.

Speer Carbon Co. — **R. W. Marek,** appointed research chemist.

Homer Foundry Corp. — **John Walker,** appointed general manager



UTILITY APPLIANCE COMPANY installation in Los Angeles features a 16 gauge x 48 inch wide cut-to-length line—with automatic sheet piler and a 21 roll leveler to produce top quality flat sheets for larger panels. Let Stamco supply the economical answer to your shearing problems with long life machines.

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and **Robert Button,** asst. general manager.

J. E. Spearman, elected vice president, sales, The Vaughn Machinery Co., Cuyahoga Falls, O.

M. A. Nye, elected vice president, engineering, The Vaughn Machinery Co., Cuyahoga Falls, O.

United States Steel Products Div., U. S. Steel Corp.—**D. O. Merrill,** named manager, sales and **R. M. Fissinger,** manager, operations, Camden District.

Aluminum Co. of America—**W. Turbeville,** appointed manager, foil product sales, succeeding **J. S. Hamilton,** now Alcoa's manager, sheet and plate product sales.

OBITUARIES

J. P. Bender, 64 retired treasurer and director, Bethlehem Steel Co.

Samuel Eidensohn, 49, chief project engineer, Exide Industrial Div., The Electric Storage Battery Co., Philadelphia.

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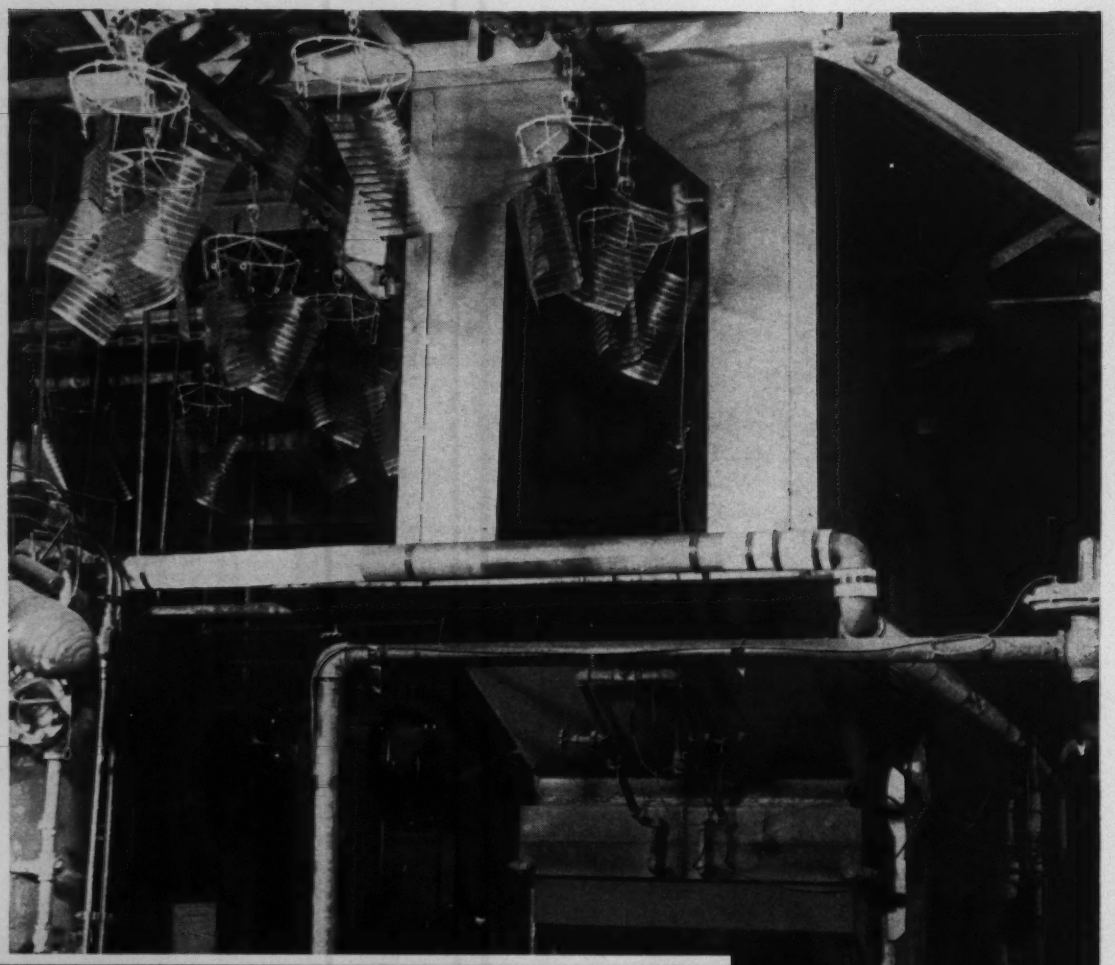
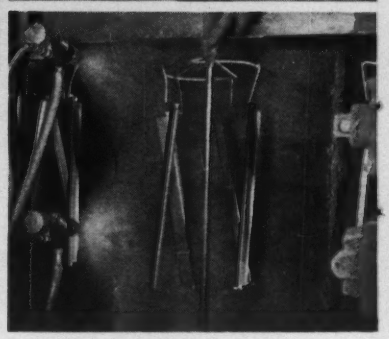


Rear grilles for Yard-Man riding mowers pass through an automatic degreasing-painting line.

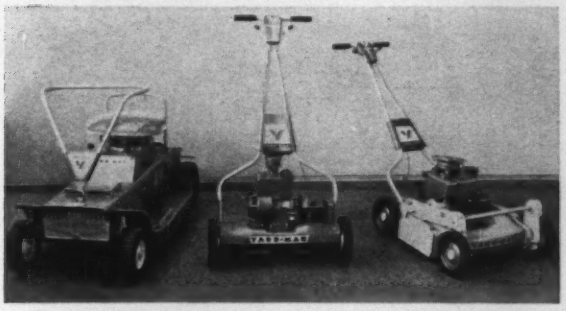
Arthur Leggett (left) Yard-Man Supervisor, plans degreasing operation with assistance of Rodger Lau, Columbia-Southern Trichlor Distributor.



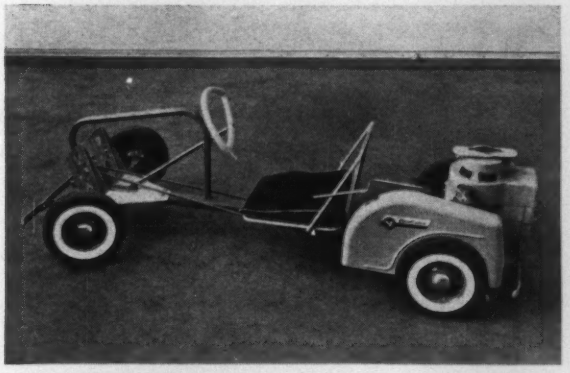
Cutter bars for reel mowers are electrostatically painted, for lasting finish.

Yard-Man selects Columbia-Southern Trichlor to assure durable, flawless finishes

The precision lawn mowers built by Yard-Man, Inc., of Jackson, Michigan, take many knocks and blows while keeping lawns trim and well clipped. And naturally they are exposed to a lot of dampness. Both of these conditions—rough handling and attack by moisture—can cause heavy damage to painted parts. To make certain paint jobs stand up well under these conditions, Yard-Man degreases parts with Columbia-Southern Trichlorethylene. That way they are sure of getting a clean metal surface that will take—and hold—a good coating of paint.



Popular Yard-Man models include (left to right) the 26 inch Riding Mower, the 21 inch Power Reel Mower, and the 22 inch Self-Propelled Rotary.



Yard-Man also makes a children's favorite—a power driven go-cart with reverse and forward drive.

A smooth coat of paint is functional as well as decorative on Yard-Man equipment. It serves as a protective layer, guarding the precision-set working parts that give Yard-Man a reputation for long-lasting, trouble-free machines. That's the reason Yard-Man painting is so important. Yard-Man has high production economy standards, too, and since many parts are painted electrostatically, in an assembly line flow, slow downs and stoppages to correct faulty work are extremely costly. Yard-Man reduces these interruptions to a minimum by running an efficient degreasing operation. And, of course, with the high production rates needed to meet demand for the quality equipment produced by Yard-Man, degreasing operations can't be interrupted often.

Yard-Man considers smart design a major sales feature, so they pay considerable attention to the styling of their units. Of course, painting is a major element in this styling scheme. That's another reason why Yard-Man insists on a good, attractive paint finish—applied to a thoroughly degreased surface.

A big factor in keeping Yard-Man's degreasing operation running smoothly is the excellent service they receive from their Columbia-Southern Trichlor distributor, Jackson Chemical Company. Yard-Man production people feel that the consultation and service supplied by the distributor are a real contribution to their work.

Yard-Man likes doing business with Columbia-Southern because Columbia-Southern Trichlor and Columbia-Southern service help keep their plant running smoothly and efficiently. You'll like doing business with Columbia-Southern, too.

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7. Clock & Watch Springs
8. Vibrator Reeds
9. Shock Absorbers
10. Razor Blades
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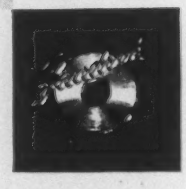
12. A wide variety of Springs
13. Textile Machinery Sinkers, Needles, etc.
14. Camera Shutters
15. Masons Trowels

This list of exacting applications is the strongest proof of Sandvik steel's consistent quality. Over the years, these users have found that when product performance depends on *specific physical properties, high fatigue life, accurate and uniform flatness, straightness, gauge, width and finish,* Sandvik quality is well worth its price.

Ask your nearest Sandvik office for further information or technical assistance.



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Readies Satellites

Private industry is slated to have the first test satellites for commercial use in orbit by the end of 1961. AT&T expects to have an active-repeater satellite, to receive and broadcast messages, ready for launching next fall. At that time, Hughes Aircraft Co. will be ready to launch a similar satellite into a 24-hour "stationary orbit."

New Job for Metal Cloth

Fabrics are playing vital roles in the U. S. space program. An ingenious heat shield protected the Discoverer XIII capsule's trip into space. It was made of several combinations of fabrics impregnated with phenolic-type resin. Other available fabrics may be of fiber or metal-woven cloth impregnated with suitable materials. One use is as a folded, lightweight space station which can be inflated in shape once in orbit.

Guillotine Cuts Cable

Explosives in metalworking are tackling new jobs. A tiny, electrically-initiated guillotine is rated to cut 3/32-in. stainless-steel aircraft cable. Cutting is achieved by explosively forcing a chisel-type blade through the cable.

How to Salvage Valves

One aircraft manufacturer reports successfully reclaiming stainless steel aircraft valve bodies by a unique approach. A porous group of castings, slated to be scrapped, were salvaged by a coating process originally designed to give only corrosion protection. The valves, coated with Wall Colmonoy's Nitrocoat, passed water-leak tests. Cost savings: 80 pct.

To Revise Research Taxes?

Space-research organizations face possible changes in tax laws governing profit from scientific research. The Internal Revenue Service is preparing to tighten rules on payments received by groups doing research. Basically, the new rules would specify that "scientific" organizations must serve the public interest and not private interests to receive tax exemption on research payments. Hearings on the proposed rule changes will be held in Washington shortly.

Brazing Alloy Takes 1800°C

A new high-temperature brazing compound can withstand environments up to 1800°C. This new alloy is particularly suitable for joining porous, refractory metals, such as tungsten, molybdenum, or tantalum to solid materials. Development of compound was in connection with a program to develop an ion propulsion system for the Air Force.

Giant Engine on Schedule

America's giant F-1 rocket engine will be ready on schedule in early 1963, reported D. E. Aldrich, program manager at Rocketdyne, div. of North American, to the American Rocket Society. The 1.5 million-pound thrust engine, which can be clustered to provide thrusts from 9-12 million pounds, will make it possible to launch 200-ton vehicles into low orbit and place 45-ton space stations in orbit about Mars.

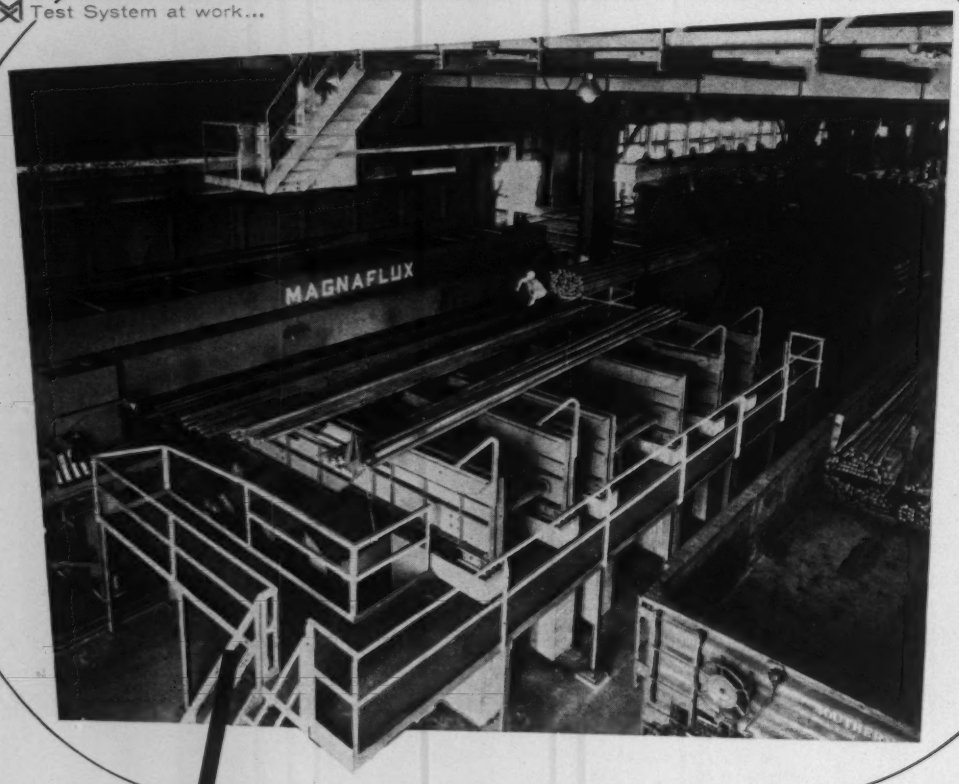
Speeds Man Into Space

Putting a man into space will occur a lot sooner if a proposed new combination of metal alloys proves successful. Molybdenum and columbium alloys will be used in vehicle re-entry tests to be conducted by Wright Air Development Div. and General Electric-McDonnell.

Increase Missile Range

Nuclear reaction may be the answer to producing hydrazine, a high-energy missile fuel, "at a price the nation can afford." An experimental program is now underway. At present, hydrazine is very costly but is capable of producing more energy than chemicals now generally used. Its use will "increase the range and payload capacity of our missiles," say scientists of Aerojet-General Nucleonics, San Ramon, Calif.

Another MX Test System at work...



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Our National Goals—3

Technological Change

Faster Growth, Bigger Problems

Our changing technology has brought benefits to many but not to all.

Growing problems are technological unemployment and the need for more basic research.—

By E. C. Beaudet

■ Technological change is often called the most powerful force in shaping our future growth. It stimulates new investment, spawns new products and creates whole new industries.

But the speed of the advance leaves many new problems in its wake. In his report to the president's Commission on National Goals, IBM president, T. J. Watson, Jr. calls attention to the dangers as well as the unlimited possibilities held out by our rapidly changing technology.

His answer to the dangers: A sure sense of direction and clear, realistic goals in the area of technological change.

Three Goals—Mr. Watson sets three goals for building a stronger nation and better world: The use of new technology to improve living and working conditions; the encouragement of technological change to meet industrial, social and economic progress, and face the challenge of communism; and the sharing of technological knowledge with underdeveloped countries.

Each technological goal comes with its particular set of problems. While technology has raised living and working conditions, it has also changed employment patterns. Fewer people are turning out more goods. In the 1950's manufacturing output jumped 40 pct while total employees increased only nine pct.

The Challenge—Workers in service industries have multiplied 25 pct in the last decade and the number of skilled and professional people has increased 58 pct. This adjustment in employment patterns will grow slowly. It will call for the re-equipping of plants and the retraining of workers.

But technological unemployment is now a definite problem in some areas and will grow larger in the future. How do we set out to meet it?

Mr. Watson says we must not only continue present aid to distressed areas through the Small Business Administration, but that it should be supplemented by new, more positive methods. These include:

1. Faster federal depreciation allowances to attract new industries. Also, state and federal governments might match local private funds in campaigns to attract new industries.

2. When attempts to attract industry to depressed areas fail, the Commerce and Labor Departments should work out inter-state programs for relocating workers in labor shortage areas.

3. Help should be given depressed areas on a sound business basis. The best way is through federally-guaranteed loans to business and communities for redevelopment, and to individuals for relocation.

4. Improve the benefits and du-

NEXT WEEK

National Goals For Foreign Trade

Foreign trade policies in the 'Sixties will be decisive importance.

Next week's article will discuss the National Goals Commission's report on future foreign trade policies.

ration of state and federal unemployment insurance plans. Supplementary unemployment benefits may offer another avenue for reducing the effects of layoffs.

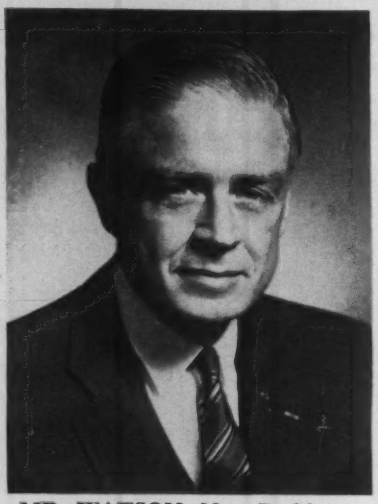
5. Setting up a top-level commission of industry, government and labor experts to study the effects of technological change and come up with a program for action.

No Simple Answer—While technological growth, or any other goals for that matter, can be manipulated in a dictatorship, how can we get the most benefit from it in a free society?

The answer, Mr. Watson says, is neither quick nor simple. The encouragement of technological change must come from industry, government and educational areas.

Of these groups, he considers private industry the most important. Our competitive enterprise system has made possible our past technological advances. Inherent in the system are the laws governing patents and antitrust matters which stimulate growth.

Build on Strengths—But rather than be satisfied with present strengths Mr. Watson feels we should build on them.



MR. WATSON: New Problems.

The government should encourage plant modernization by granting more liberal depreciation allowances for new capital expenditures. It must also press for more liberal trade policies.

Since more than 60 pct of all research and development money is spent by the Federal government, it now plays the most important role in technological change.

To encourage further advancement, Mr. Watson contends the government should assess the overall technological effort and take steps to strengthen or modify it.

Better Bids—It should also make more room for applied research and development in government-supported projects.

Finally, a new approach to competitive bidding on government contracts must be found. Now, too much top technical manpower is wasted on time-consuming bidding procedures. This not only wastes money but slows progress.

Mr. Watson scores better education and re-education a must in encouraging technological change. The problems of the next decade in economics, space science and automation will demand better-trained and more open minds than ever before, he says.

Share Progress—Not the least of our technological goals, according to Mr. Watson, is the need to share our progress with other nations.

Helping other countries build stronger economies and more prosperous citizens, will make friends and strong allies in the struggle with communism.

On the other hand underdeveloped nations, with small wealthy classes and large, poor working classes, make discontented, weak allies.

Industry and private investors can do much to further our political and economic goals abroad. Foreign investment can step up technological progress by supplying the capital and know-how needed to speed up the economies of less developed nations.

Basic Needs—But it can't do it alone. Since the economic problems in many nations are so basic, our government must take on more of the task, helping solve their educational, housing and health problems.

To further aid underdeveloped countries in the technological area, Mr. Watson calls for more U. S. technicians to work abroad; greater coordination of programs for exchanging technical assistance; and more exchange of technical information.

Science Goals — Goals for sci-

CHANGING TECHNOLOGY: Tape controls for machine tools are one dramatic sign of our changing technology. Fewer operators produce more.

Goals for Science: No Fixed Targets

Reporting to the Commission on National Goals, Dr. Warren Weaver sets up broad, moving targets for science. He sees them less as fixed, attainable goals, and more as directions in which we should move and keep moving. Dr. Weaver ranks people first in importance, then assigns other goals in order.

Human Resources

Since science (and all other fields) depends on educated manpower, every young person of intellectual promise must be given an opportunity to develop fully.

High-school and grade-school students should be appropriately exposed to the interest, importance, beauty and excitement of science.

Science students should be exposed to the best education our leading scholars can devise.

The importance of teaching at all levels of education should be recognized and rewarded.

Science-The Good Life

Develop science energetically and broadly, not to be ahead of someone else, but to be worthy of ourselves.

Increase and improve ways of giving all citizens a better understanding of science.

Try to bring science into the whole of life, to a union with the humane arts.

Bring science in all its aspects (basic, applied and philosophical) to the service of less-favored countries and peoples.

Develop scientific activities which contribute to international understanding and peace.

Seek balanced development of all science. Recognize that all phases are part of a whole.

More Specific Goals

Support: Raise national support for science from $800-900 million to as high as $1,500 million a year.

Increase the number and variety of nonfederal sources of support for science.

Substantially increase the size, flexibility and stability of federal support of science in universities, including aids to teaching.

Reestablish the great role colleges and smaller institutions used to play in the recruiting and training of scientists—through federal support.

Planning: Avoid the danger of too-much and too-concentrated planning of national scientific effort. Most scientists see no benefit in centralized planning.

But there is a need to find ways for effectively judging priorities for national science efforts.

Recognize the growing role of the science - administrator. Give these positions the organizational, intellectual and financial stature to attract and hold first-rate people.

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ence, drawn up for the commission by Dr. Warren Weaver, vice president of the Alfred P. Sloan Foundation, lay heavy stress on the need for more education and research.

Most important in Dr. Weaver's view is that all citizens know more about what science is, how it operates and what makes it grow.

As he sees it, there are three reasons for this. Science is now so bound up with vital social and political problems (control of space, air pollution), that the problems cannot be solved without some understanding of science.

Wiser Support — Also, since so much scientific development is government-supported, and the government is controlled by the people, they must understand it better to be able to support it wisely.

Finally, the thinking gap between a small body of scientists and leaders in other thought areas has widened disastrously, Dr. Weaver says. To provide a richer life for all, their thinking must be based on closer understanding.

DR. WEAVER: Keep Moving.

Balance—Throughout his report to the Commission on National Goals, Dr. Weaver strikes a note of balance. He says, "Science is by no means all there is to life . . . we must recognize and respect other goals, very different in motivation and kind." He suggests that the goals for science be considered in relation to goals in other areas and that priority be based on other than scientific considerations.

Both Dr. Weaver's and Mr. Watson's reports appear in full in a recently published book, "Goals for Americans."

Reprints of this article are available as long as the supply lasts. Write Reader Service, The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

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New Tool Steel Gives Long Life

Entry Into High-Speed Field Vies With Many "Specials"

Tool makers choose from more than 20 steels when dealing with hard-to-machine metals.

Now, one new tool steel is expected to do the job of most of these "specials"—with longer tool life as an added bonus.

▪ Designed to give much longer life in machining hard-to-cut metals is a new grade of high-speed steel.

"This new high-speed steel promises to be the outstanding composition for tools designed to cut such materials as highly-alloyed steels, stainless steels, superalloys, and titanium." So reports D. W. Kaufmann, product manager of tool steels, Crucible Steel Co. of America.

Outperforms Other Steels — It's reported that the new tool steel, named Rex 49, is outperforming the more costly high-speed steels. It's expected to eliminate the need for many of the twenty-odd special-purpose grades now in use.

Adds Mr. Kaufmann, "This steel is undergoing exhaustive evaluation in production use to confirm the preliminary laboratory and field tests.

"The steel can be heat treated to Rc 67-69. In tests so far on many hard-to-machine metals, it has outperformed other high-speed steels, increasing tool life 2-4 times. In the cutting of more normal materials, its use permits increases in speed, feed, or depth of cut."

Machining Problems—What were the reasons behind this development? In recent years, the hardness of materials to be machined has been increasing steadily. The newer space-age metals have brought new machining problems.

In the case of many of these materials, it's not so much their room-temperature hardness but the strength and abrasive character of the chip which are responsible for short tool life.

Parts to be machined have become larger and more complex in shape. Design needs have pushed heat-treated strength levels higher and higher. The practice of heat treating before final machining is widely used to avoid distortion.

Must Improve Products—As a result, makers of high-speed tool steels have been under constant pressure to improve the cutting efficiency of their products — especially those which must cut the hard or otherwise difficult-to-machine alloys.

The history of the tool-steel industry points up its ability to adapt to the times. Up to World War II, AISI type T1 was one of the industry standards. At that time, restriction on tungsten use led to T1's modification—replacing some of the tungsten with molybdenum.

Gradually, the substitute became an industry standard. Today, molybdenum grades have replaced tungsten grades in a large part of the market.

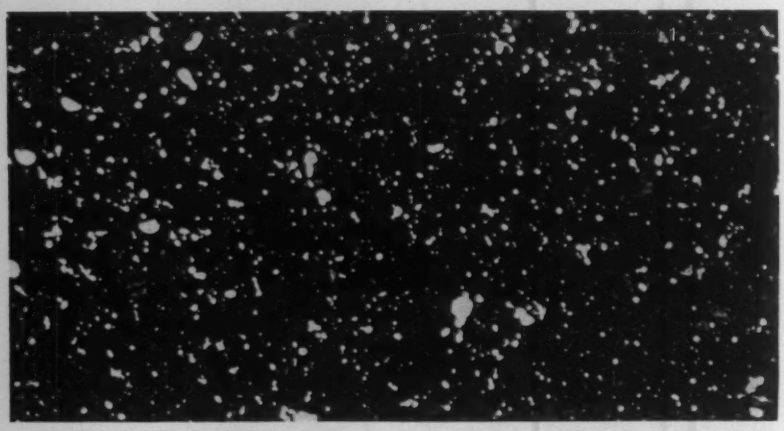
Improves "Red" Hardness—Other modifications have also come about. Cobalt, more vanadium, or both have been added to tool steels. Cobalt gives greater "red" hardness. Vanadium provides better tool life in cutting abrasive materials. Carbon content is adjusted accordingly.

How Rex 49 Reacts to Heat Treatment

Tempering Temperature, °F*	Hardness, Rc**
As quenched	64.3
975	68.5
1000	68.9
10.25	68.2
10.50	67.5
10.75	67.2
1100	65.7

* Austenitizing was at 2200° F in salt bath for 1 minute. Tempering was 2 + 2 + 2 hours.

** Average of ten readings in each case.



TEMPERED STRUCTURE: Photomicrograph is of section of tempered, hard (Rc 68), Rex 49 tool bit. New tool steel also has high cutting efficiency.

How Tool Steel Performs

Crucible's metallurgists have been aware of the growing problem of dealing with the new hard-to-machine metals. They've recognized the potential value to both producers and users if one really superior high-speed steel could be developed to replace the many "specials" now in use.

In attacking this problem, they made these assumptions. Crucible's Rex M2 type would be the best base composition. Adding 5-pct cobalt would increase cutting efficiency. A heat-treated hardness of Rc 68 would be desirable. Highest attainable hardness could be achieved if the proper amount of carbon is added.

Resists Softening — It's konwn that hardness of high-speed steel at high temperatures is a function of the room temperature hardness. Also, the higher carbon in Rex M2 helps resist softening at high temperatures.

The assumptions have proved to be good ones. The new tool steel is coming up to all expectations. The composition is: carbon, 1.10 pct; chromium, 4.25 pct; tungsten, 6.75 pct; molybdenum, 3.75 pct; vanadium, 2.0 pct; cobalt, 5.00 pct.

It can be easily hardened and tempered to Rc 67-69. When atmosphere - controlled furnaces are used, the preheating range is 1500°-1550°F; the hardening range is 2200°-2250°F. When salt - bath heating is used, the hardening range is 2175°-2225°F.

Triple Tempering — General quenching and tempering techniques for other high-speed steels apply in the case of Rex 49. One exception is that for optimum properties triple, instead of double tempering, has been found to be desirable. Hardness obtained on 1¼-in. square x ½-in. samples after heat treatment are given in the first table.

The second table includes Crucible test results on the machining of various metals. Note that its performance is consistently better than type T-15 tool steel.

WORK SAMPLE	CUTTING TOOL*	CUTTING SPEED, sfpm	TOOL LIFE, minutes
AISI 4340	Rex 49	25	99.4
(quenched and	Type T-15	25	49.5
tempered)	Type M-15	25	9.0
Size —6-in. round	Rex M3 Type 2	25	3.5
Hardness —Rc 53			
Depth of cut —1/16 in.	Rex 49	31	55.0
Feed —0.009 in/rev.	Type T-15	31	27.0
Coolant —Dry	Type M-15	31	1.8
Tool Design — ****	Rex M3 Type 2	31	4.4
	Rex 49	35	35.6
	Type T-15	35	16.8
CSM #2	Rex 49	30	57**
(heat treated)	Type T-15	30	36
Size —6-in. round	Rex 49	35	38**
Hardness —300 Bhn	Type T-15	35	28**
Depth of cut —1/8 in.	Rex AA (T1)	35	12
Feed —0.015 in./rev.	Rex Supercut (T5)	35	13***
Coolant —Dry	Rex 440 (T6)	35	32***
Tool design — ****			
	Rex 49	40	24**
	Type T-15	40	17**
	Rex 49	43	15***
	Type T-15	43	7**
AISI Type 410	Rex 49	60	94
(heat treated)	Type T-15	60	58
Size —3-in. round			
Hardness —Rc 40	Rex 49	70	47
Depth of cut —1/16 in.	Type T-15	70	30
Feed —0.009 in./rev.			
Coolant —Dry	Rex 49	75	11
Tool design — ****	Type T-15	75	5
AISI Type 316	Rex 49	40[1]	66
(annealed)	Type T-15	40[1]	35
Size 3-in. round	Rex 49	50[2]	25
Depth of cut —1/16 in. and 1/8 in.	Type T-15	50[2]	18
Feed —0.009 in. and 0.015 in.	Rex AA	50[2]	12.8
Coolant —Dry			
Tool design — ****			

*All tools heat treated to maximum hardness. ** Average of 2–6 tests. *** Single test. [1] ½-in. depth of cut, 0.015 in./rev. feed. [2] 1/16-in. depth of cut, 0.009 in./rev. feed. **** Size—½-in. square x 4½ in., Back rake—3°, Side rake—6°, Front cutting edge angle—10°, Side cutting edge angle—10°, Front clearance angle—10°, Side clearance angle—10°, Nose radius—0.030 in.

How to Weld Columbium Alloys

Use of New Engineering Materials Hinges on Proper Techniques

Despite the growing acceptance of columbium and its alloys, they've had their share of welding problems.

Here are some of the methods that have been tried and found successful.

▪ Columbium is an attractive engineering material for high-temperature use. However, at very high temperatures, it weakens and shows poor oxidation resistance.

Alloying improves its strength and oxidation resistance. But weldability suffers. Embrittlement is probably due to a precipitate formed from one or more of the alloying elements. Moreover, welding processes must avoid contamination with oxygen, nitrogen, carbon and hydrogen.

Reviews Welding Data — Much research has been conducted into this problem. A report, just released by the Defense Metals Information Center, Battelle Memorial Institute, Columbus, O., reviews and evaluates the available welding information on columbium and its alloys. The authors are W. J. Lepkowski, R. E. Monroe, and P. J. Rieppel of Battelle.

The most widely used joining processes for unalloyed columbium, they report, are tungsten-inert-gas (TIG), resistance, electron-beam and ultrasonic welding.

The TIG method has been used to weld columbium in air or in a gas-filled chamber. Bend test data (the graph) show that most welds, made in a gas-filled, vacuum-purged chamber, can be bent 180° without failure.

Need Gas Backup—When using the process in air, gas backup and an auxiliary trailing shield are musts. Otherwise, welds will have little or no ductility. Also, weld-metal hardness will be higher. The major contaminant appears to be nitrogen.

Does the welding chamber have to be evacuated and then backfilled? Can it just be flow purged? Research results show that more consistent weld quality occurs when the former technique is used. This is as expected, state the authors.

It's quite likely that electron-beam welding offers some advantages for welding columbium. But no data are available on welds made on unalloyed metal. Messrs. Lepkowski, Monroe, and Rieppel also point out that contamination of the weld by the atmosphere is unlikely. Why? Because that welding method is done under vacuum.

Resistance Welding—Columbium isn't restricted from welding in air. Resistance welds can be made. Take care though that weld time is only one or two cycles. If the time is longer, a shield from the air is recommended. Current density for metal 0.004-0.006-in. thick, should be about 85,000 amperes per sq in.

"Electrode sticking has been perhaps the most serious problem when resistance welding columbium. Heavy pressure between the electrode and the stock must be avoided."

Some answers may be to develop a suitable electrode material or to obtain a diffusion-type bond with

Electron Beam Vs. Tungsten-Inert-Gas Welding

TABLE 1: BEND AND TENSILE PROPERTIES OF WELDS ON Cb-0.75Zr ALLOY

Weld Method*	Test Temp., °F	Average Ultimate Tensile Strength, psi	Average Yield Strength, psi	Average Elongation, per cent in ½ in.	Average Elongation, per cent in 1 in.	Bend Angle, degrees	Bend Radius
TIG	Room	—	—	—	—	120	1T
EB	Room	—	—	—	—	120	1T
TIG	600	—	—	—	—	120	1T
EB	600	—	—	—	—	120	1T
TIG	70	59,400	42,100	12	16	—	—
EB	70	57,000	36,200	14	22	—	—

* TIG = Tungsten inert gas. EB = Electron beam.

Boeing Airplane Co.

resistance-welding equipment.

Joins by Ultrasonics—How about ultrasonic welding? With this method, there appears to be no molten metal to become contaminated by the air. One limitation, though, is the thickness of material that can be joined. Ultrasonic welds have been made at Battelle on unalloyed 0.015-in. sheet columbium. However, cracking occurred.

Diffusion Bonding—Columbium's low neutron-capture cross section suggests its use as a building material for nuclear applications. Cladding of columbium to cermet and ceramic-type fuels requires gas-pressure bonding techniques.

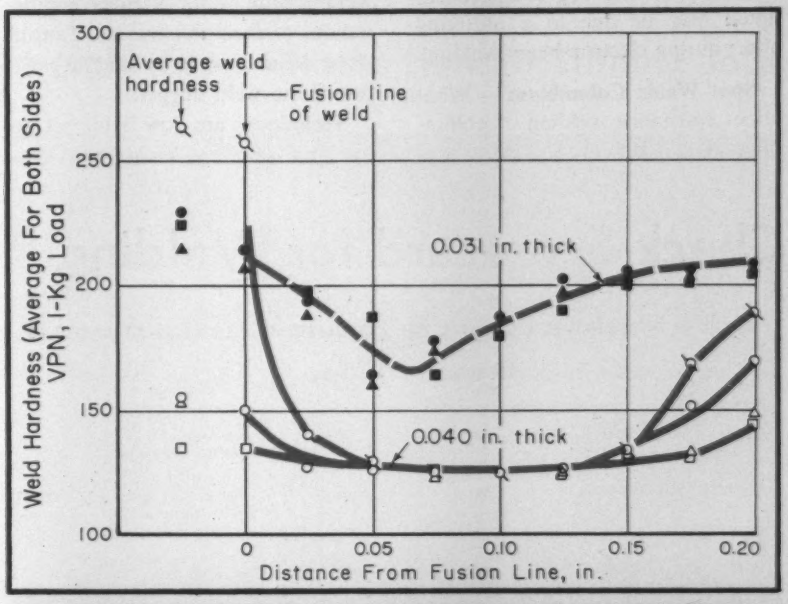
This technique produces metallurgical bonds. Fusion doesn't occur; hence, cast structures are avoided. Cladding is performed by sealing fuel and columbium in an evacuated stainless steel container. Then, the unit is subjected to an inert-gas pressure of 10,000 psi at about 2100°F for 3 hours. The evacuated container protects the columbium from oxidation and is thin enough to transmit pressure to the fuel-element assembly, and to produce a bond.

Does Alloying Help?—When it comes to alloys of columbium, most of the available welding information deals with the TIG process. The effect of alloying elements on the TIG welding of columbium are being studied. Elements under study include zirconium, titanium, hafnium because they neutralize the effects of oxygen or nitrogen.

Molybdenum, tantalum, tungsten and vanadium are also being studied because they act as strengtheners. Cobalt, chromium, thorium and aluminum are included in the research because they probably promote poor weldability.

Lean alloys were apparently not difficult to TIG weld, report the authors. Arc-melted material was welded with a dc arc, straight polarity, in a helium-filled welding chamber. Each alloy was vacuum annealed for 1 hr at 2730°F prior to welding. There was some porosity at the fusion line of all welds examined.

Argon Affects Weld Ductility



Symbol	Current, amperes	Arc Voltage, volts	Speed, ipm	Argon Flow Rate, cfh: Torch	Trail	Backup	Minimum Bend Radii or Bend Angle*	Remarks
●	125	10-12	20	—	Chamber	—	1T, >1T, 180°, 180°	—
■	110-124	11-11.5	20	20	20	4	>1T, 180°, 180°, 180°	—
▲	100	12.5-14	40	20	20	4	5T, >1T, >1T, 180°	—
○	115	10	20	—	Chamber	—	180°, 180°, 180°	Top surface discolored
◎	100	12	20	14	—	6	<5T, <5T, <5T <5T, 5T, <5T	Top surface discolored
□	100	12	20	14	14	6	<5T, <5T, <5T <5T, 5T, 5T	—
△	170	13	40	14	14	6	5T, 5T, 5T, 5T, <5T	—

* Bend tests made by using successively sharper radii to determine minimum (in terms of thickness, T) before cracking. Bend angle noted if no bending occurred (0°) or if no failure occurred and sample could be flattened (180°).

Affect Transition — Results of bend tests on 0.060-in. sheet show that tungsten, vanadium, or zirconium additions to columbium increased the brittle-to-ductile transition temperature. Adding 1-pct titanium also raised the transition temperature. On the other hand, it was lowered by adding 1-pct hafnium.

A number of companies are performing research on welding of these alloys. General Electric, for example, is studying the FS-82 and F-48 alloys. Test results are given in Table 2. Bends, made on the F-48 alloy welded with a Cb-1Zr filler and given a 2500°F vacuum-heat treatment for 2 hr, were ductile. Brittle failures in other specimens were believed due to carbide precipitation in the grain boundaries of the heat-affected-zone.

Embrittles Welds—An unknown precipitate is also believed to be the cause of embrittling of the heat-affected zone in Cb-10Ti-10Mo. It may be a result of interstitial impurities.

Some electron-beam welding tests have been made for Boeing Airplane Co. The alloy was arc-cast Cb-0.75Zr alloy. Results (listed in

Table 1) show no great differences in properties when compared with TIG welds. Any slight differences noted may be due to a purifying effect during electron beam welding.

Spot Welds Columbium — What about resistance welding of columbium alloys? Researchers at General Electric Co. have spot welded the FS-82 alloy. The third table lists weld schedules for various combinations of sheet thicknesses. Tensile shear failures were by ductile pull-out of the weld nugget.

Techniques are now being set up for the F-48 alloy. Welds were brittle when spot welds were of the cast nugget type. Cracking has occurred during welding.

Inserting a 1-mil-thick titanium foil at the interface gave the highest tensile-shear properties in welds to date. Data are given in the fourth table.

Check Scorecard for Welding Results

TABLE 2: FUSION-WELD STUDIES ON COLUMBIUM ALLOYS FS-82 AND F-48

Alloy	Filler Rod	Weld Current, amperes	Weld Voltage, volts	Treatment	Bend Angle, degrees	Bend Radius, T	Location of Failure*
FS-82	FS-82	82	20	As welded	104	3.1	None
				1900° F 1 hr, vacuum	51	3.1	Weld
FS-82	FS-82	80	15	1900° F 1 hr, vacuum, plus 1000° F 2 hr, heated to 2100° F in furnace, held 1 hr, vacuum.	102	3.1	None
F-48	Cb-1Zr	60	19	As welded	16	6	Weld
				2200° F 1 hr, vacuum	0	6	HAZ
				2500° F 2 hr, vacuum	105	6	None
F-48	FS-82	55	18.5	As welded	0	6	HAZ
				2200° F 1 hr, vacuum	0	6	HAZ
				2500° F 2 hr, vacuum	0	6	HAZ
F-48	Cb-1Ce	58	19	As welded	0	6	HAZ
				2200° F 1 hr, vacuum	0	6	HAZ
				2500° F 2 hr, vacuum	6		Weld
F-48	Cb-1 misch metal	50	18.5	As welded	0	6	HAZ
				2200° F 1 hr, vacuum	0		HAZ
				2500° F 2 hr, vacuum	0	6	Weld

* HAZ—heat-affected zone.

General Electric Co.

TABLE 3: SPOT-WELDING SCHEDULE FOR FS-82 ALLOY

Sheet Thickness Combination, in.	Electrode Type	Electrode Diameter, in.	Weld Force, lb.	Weld Current, amperes	Heat Time, Cycles	Up-Slope Time, Cycles	Down-Slope Time, Cycles	Hold Time, Cycles	Tensile Shear Strength, lb.
0.010-0.025	M28	3/32	151	6,100	6	2	3	60	150
	M28	3/32	156	6,100	3	0	0	60	—
	M100	3/32	250	7,770	2	1	0	60	—
0.025-0.025	M28	3/32	2200	25,500	4	2	0	60	900-1000
0.010-0.010-0.025	M100	3/32	250	8,880	2	1	0	60	195
0.010-0.070	M100	1/8	450	9,100	6	2	0	3	—
0.070-0.070	M100	1/4	2200	27,100	6	2	2	3	2700

General Electric Co.

TABLE 4: SPOT-WELDING DATA FOR THE F-48 COLUMBIUM ALLOY

Sheet-Thickness Combination, inch	Squeeze Time, cycles	Hold Time, cycles	Preheat Time, cycles	Preheat Current, amperes	Weld Time, cycles	Weld Current, amperes	Forge Delay, cycles	Pressure, psi	Tensile-Shear Strength, pounds: Without Titanium Foil	Tensile-Shear Strength, pounds: With Titanium Foil
0.040-0.040	3	60	60	3,500	2	17,500	60	650/1500	800	1,080
0.020-0.020	3	60	60	3,500	2	17,500	60	650/1500	500	900

General Electric Co.

Plastic Chucks Support Tubing

Lightweight Step Chucks Handle Turning Jobs

Step chucks made of laminated plastic can reduce the machining time on soft materials.

The free-machining plastic also pares chuck inventory needs.

■ When tube stock is being turned and finished, and a variety of sizes are being handled, step collet chucks offer several important advantages.

On many tube turning jobs where the workpiece is made from a soft metal, laminated plastic, vulcanized fibre or has a comparatively thin wall, the conventional three-jaw universal chuck or four-jaw independent chuck may not be satisfactory.

Pressure on the work piece is concentrated at only a few points so that the jaws may mark the material or even collapse the wall. A step chuck made of laminated plastic can solve this problem.

EVENLY DISTRIBUTED: This step collet chuck, made of laminated plastic, affords full 360° support for turning and finishing of tubular parts.

360° Support — The laminate-plastic collet chuck expands to hold the tube from the inside or contract to grasp it from the outside. This offers support over all of the tube surface. With pressure evenly distributed over 360 degrees, there is almost no likelihood of marring the tube or crushing the walls.

There is a limit though, to how far the segmented collet can be expanded or contracted. A shop processing a wide range of tube sizes may thus find itself with a heavy chuck inventory. This can be reduced by cutting steps on both the outside diameter and inside diameter of the chuck.

Operators can then use a single chuck to hold tubing in a large variety of sizes by simply slipping the tube onto the proper step. Large diameter work is gripped by the outside steps. This is done by expanding the segmented collet against the inside of the tube.

The smaller diameter work is gripped by the inside steps by contracting the collet on the outside of the tube.

Handles the Load — Because of its high strength, laminated plastic can be used effectively for chucking many heavy jobs where conventional chucks are thought necessary.

The easy machinability of laminated plastic also makes it practicable to machine new steps onto the chuck to accommodate new tube sizes as often as needed. This can be done while leaving old steps intact. Fewer chucks required means fewer chuck changes and an added payoff in production since less time is lost setting up.

Less Weight—An additional advantage of the laminated plastic as a chuck material is that it affords a weight saving. The laminated chuck shown in the photograph weighs 50 lb less than conventional chucks.

The lighter weight on the spindle of the lathe makes it possible to turn at higher speeds. This often pays off in greater productivity.

The chuck illustrated is an air-operated step chuck, which is used on LeBlond lathes at Taylor Fibre Co., Norristown, Pa. The chuck is one of 16 such chucks which between them can handle the entire size range of laminated plastic and vulcanized fibre tubing.

Notice that this chuck has three sets of steps, one on the outside diameter, within the outer flange, and at the center, with a total of six steps.

What Changes Does Future Hold For Iron Ore Industry?

Charting the future of the iron-ore industry is important. Affected by it is the steel industry—even our whole economy.

This study on world-ore reserves, growing consumption, and imports versus exports points up some interesting trends.

■ The iron ore industry of the world has experienced many changes over the past decade.

New sources and qualities of ores have become available. Pellets, sinter, nodules, and concentrates are new words added to the steelmaker's vocabulary. No longer are the historic qualities of the old stand-by ores proper standards for price valuation. Improved transport and handling services and new practices have also affected the industry.

Charting of these factors, to better understand the world-wide picture, was described at the recent Pittsburgh Regional Technical Meeting of the AISI. The speaker was R. M. Lloyd, administrative vice-president, International and Raw Materials—Staff, U. S. Steel Corp.

What Are Conclusions? — Mr. Lloyd makes these points. The particular sources of iron ore which will be developed and utilized to the highest degree in the future will depend solely on economics.

The world's reserve of iron ore is ample to take care of foreseeable requirements—as long as iron ore moves freely in the world's markets.

A continued free and unrestricted flow of iron ore is essential for economic reasons as well as from the point of long-term supply. It's vital to the best interests of the iron ore industry, the steel industry and the public at large.

Compare Capacities — The first chart shows the steelmaking capacities of leading nations in 1958. Note that the greatest concentration of steelmaking, next to the United States, is in Europe.

Mr. R. M. Lloyd points out that, historically steel-producing centers have always been located near the raw materials—the iron ore, coal, and limestone. Recently, though, other considerations such as market potentials and national politics are playing parts in selecting steel-plant sites.

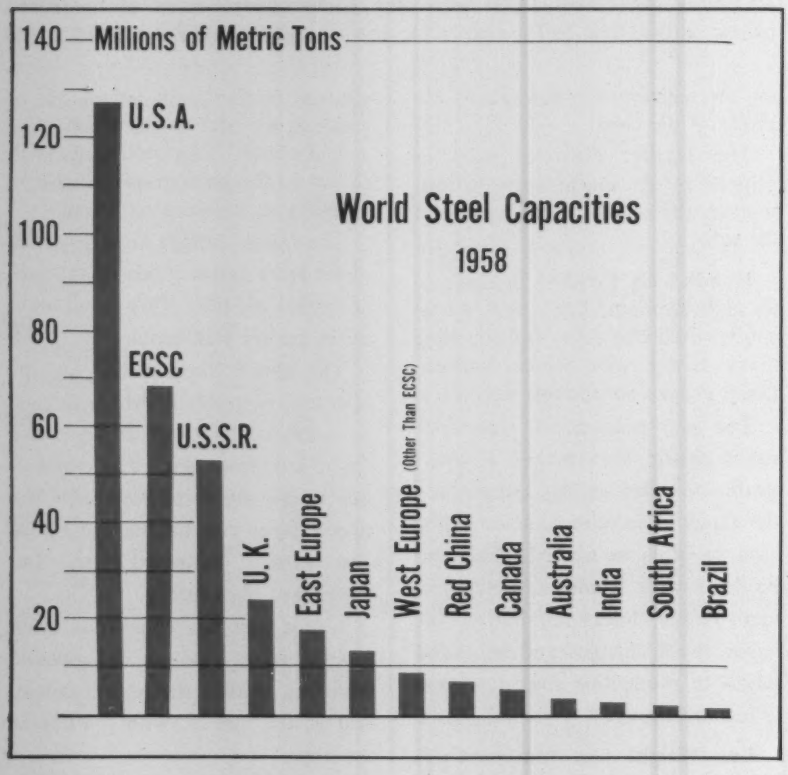
Examples include the "number of small steel mills springing up in Latin America, the growth of the Japanese steel industry, and the geographical dispersion of steel mills within the United States and Europe to take advantage of local markets."

Steel Demand to Rise—It's expected that the total world demand for steel will double in the next 20-25 years. The second chart projects steel production to 1990. It also estimates the tonnage of iron ore needed to meet these steel needs.

World-ore needs, for example, will rise from about 190 million annual tons of iron-in-ore to 450 million tons by 1990.

This increase in capacity will not

How Steelmaking Nations Rank



be uniform all over the world. The newly developing countries will probably show greater than average rates of increase. Thus, not only will demand for ore go up, but there will be a re-alignment of demands in many of the world markets.

Quality is Factor—How about quality? asks Mr. Lloyd. Years ago, iron ore, coke, and labor costs were low. Depreciation allowances were realistic. Furnace operators were economically justified in maintaining high slag volumes and in building more furnaces to increase production.

Today, he notes, the situation is entirely different. Emphasis must now be on getting maximum production from each furnace.

One way is to upgrade ores, both chemically and physically. This is feasible when the added cost of the prepared ore is recovered in improved blast furnace production.

Prepare Entire Burden — It's likely that this trend of beneficiating low-grade ores into tailor-made feed will continue until 100 pct of the blast furnace burden is prepared. Those ores which can be beneficiated at low costs into a high-quality furnace feed will probably be used in preference to less tractable although, perhaps higher grade ores.

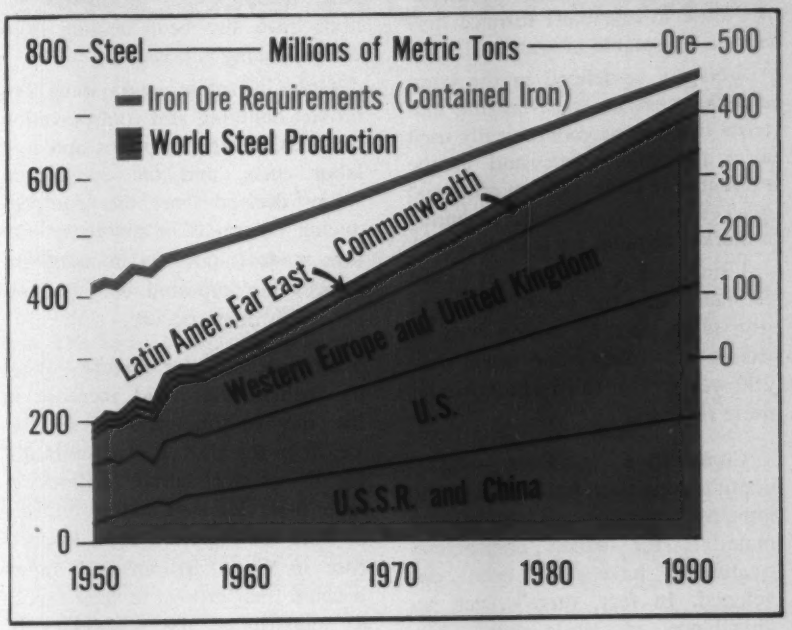
As a result of new steel-making techniques, such as the oxygen converter, the use of oxygen in the openhearths, and the increasing use of electric furnaces for making specialty steels, the demand for openhearth-quality lump ores for charge purposes will probably never increase much over present needs.

New Processes Compete — Another development, expected to influence the iron-ore industry in the future, is the use of direct-reduction processes. Indications are that, under special conditions, they may compete with new blast furnace capacity.

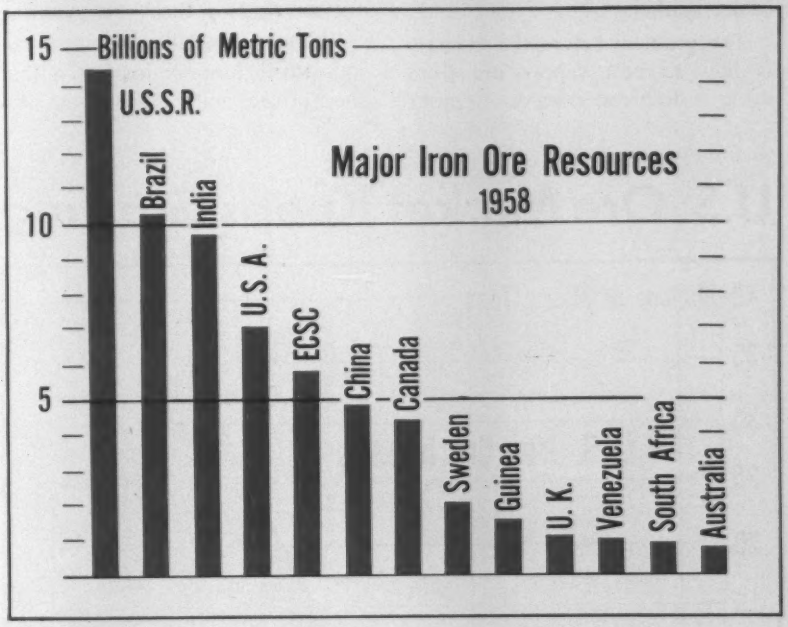
"The effect would be to disperse small steelmaking facilities into areas having local raw material supplies but limited steel markets. Potential areas of this type occur locally in the United States, the Near East, North Africa, Western Canada, Mexico and several South American countries. Net result: a wider distribution of steel-making facilities made feasible by increasing use of electric furnaces and, in the more distant future, by direct reduction plants."

Ores Are Not the Same—How about the supply side of the picture? asks Mr. Lloyd. Even though

World Steel Needs Will Double



Check Lineup of Ore Resources



the supply of ore is almost limitless in most regions of the world, an ore used in one blast furnace may not be acceptable in another.

Iron ore is defined in the commercial sense as "iron-bearing material that can be economically used at a particular place and at the present time under current costs and market price conditions, assuming a market demand for iron or steel."

Using such a definition, it's been estimated that the world reserve of iron is at least 68 billion tons of iron-in-ore—plenty for more than 200 years. The third chart locates these reserves.

Competition is Keen — This doesn't even take into account the immense tonnages of iron-bearing materials for which commercial treatments have not been developed. In fact, there's such an abundance of ore, states Mr. Lloyd, that competition is sure to be keen. In fact, materials sold as ore in the past may not have a future market.

The problem before the industry is how to best supply ore from these widespread reserves to meet future demands for steel. In the past, leading steel producing nations have also been leading iron-ore producing nations.

Only in recent years have improved handling and transportation methods, rising ore prices and mill labor costs, and the consequent values derived from the iron-producing potentials of higher quality ores made it possible in many instances for imported ore to compete with domestic ore.

Economics Enter Picture—What lies behind the rapid increase in the use of imported ores after 1952? In the U. S. it was the building of new steelmaking facilities remote from domestic sources but accessible for imported ores. Imports rose in Great Britain and Japan because their growth in steel capacity outstripped the economics of domestic ores. Imports rose in Western Europe because it was more economical to import ores than to further develop their own sources.

In every case, the reason for the increase in iron-ore imports is that the "price-quality ratio of the imported ores is more attractive than that of the available domestic ores.

Influence the Ratio—There are three important factors to influence the price part of this ratio, according to Mr. Lloyd. They are: mining costs, transportation costs, and artificial trade restrictions.

It's generally true that iron-ore exporting countries enjoy lower mining costs than the importing countries, he points out. This may be due to modern and efficient plants, as in Canada and Venezuela, or high labor productivity in terms of wage costs, as in India and Brazil.

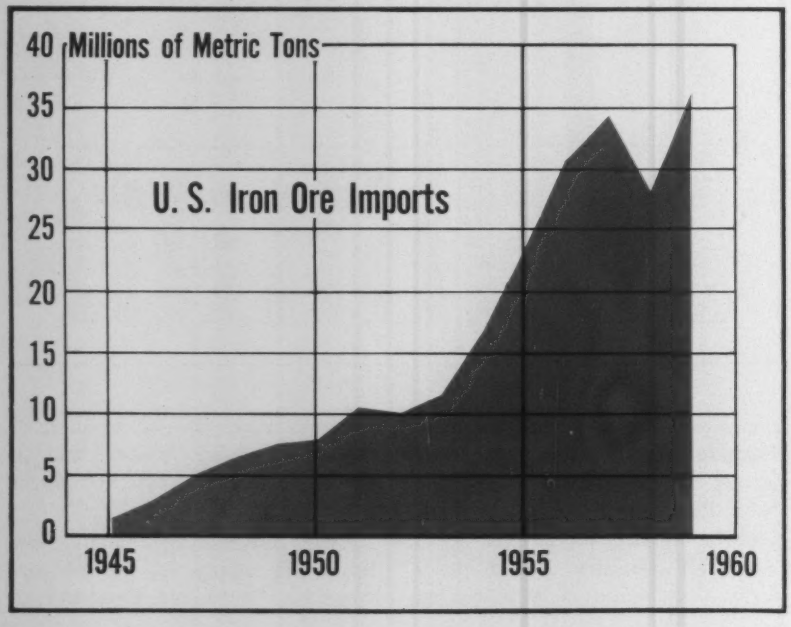
Lower vessel shipping rates were an important factor in developing the export trade. These were largely made possible by building large, specially-designed ore carriers and related ore-handling facilities and deep-water ports. However, required capital investment is large and can only be justified over a considerable annual tonnage.

Trade Will Concentrate—"Thus, export trade, over the years, will tend to concentrate in large operations that can support the capital investments required for low-cost transportation. The more remote is the ore source from consumption centers, the more important is transportation as a price factor."

Artificial trade restrictions, such as quotas and tariffs, constitute the third influence in determining price and the pattern of trade in the international market. Iron ore, fortunately, has had no tariffs or quotas imposed upon it.

Suppose that in a mistaken effort to assist the domestic iron-ore industry, restrictions should be placed on imports of ore into the U. S. It's expected that the unfavorable price-quality ratio of domestic ores would tend to increase the cost of steel and steel products. This, in turn, would result in decreased exports and increased imports of steel and steel products. Result: domestic production of steel, and, hence, iron ore would decrease.

U.S. Ore Market Keeps Growing



Unit Recovers Gold From Plating

Solution is Filtered Directly From Drag-Out Tank

Platers often watch a part of their profits go down the drain with still-usable solutions.

Here's a new recirculating unit that filters the solution's value before it's discarded.

▪ Gold recovery, a topic of much concern by our government, also causes careful thought among electroplaters. Among the space-age needs there is a strong demand for precious metal plating. Space-bound components use gold and platinum coatings to protect against atmospheric conditions.

The plater's concern is with the precious gold solution that is washed down the drain, for likewise go some of his profits. To end these losses, Technic, Inc., Providence, has designed a gold saving unit that regains the precious metal.

Costly Problem — Experts say that 4-10 pct of all gold used in electroplating is lost during the final rinsing of plated objects. With gold plating solution costing $40 to $50 per gal, the total loss could run into millions annually.

Normal practice is to conserve the original gold solution by dipping the plated item into a tank of water, right after plating. A gold concentration is built up in this drag-out tank which can be used to replenish the main.

In the next step, however, a running-water rinse carries some gold solution down the drain. This is where the Gold Saver, as the unit is called, sets itself for action.

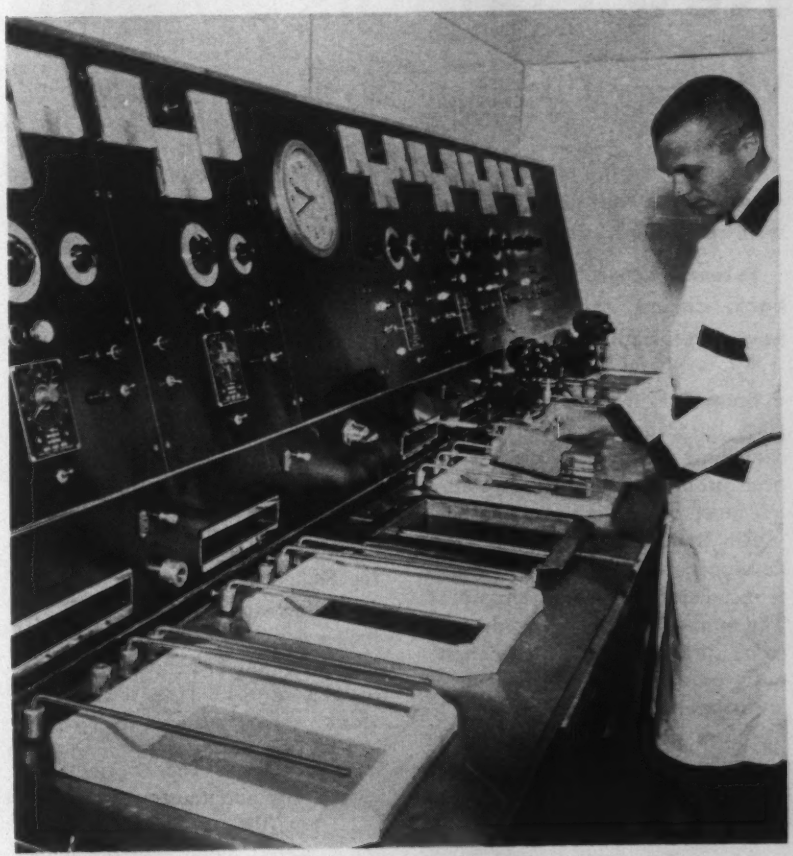
Saturates Resin—The gold saving unit uses a pump and a column of special resin to trap the precious metal before the final rinsing. The pump circulates the diluted gold solution through the resin.

When the resin becomes saturated with gold, it is reclaimed by the plater, a refiner or by Technic, Inc. The unit is designed for any acid or non-free cyanide golds.

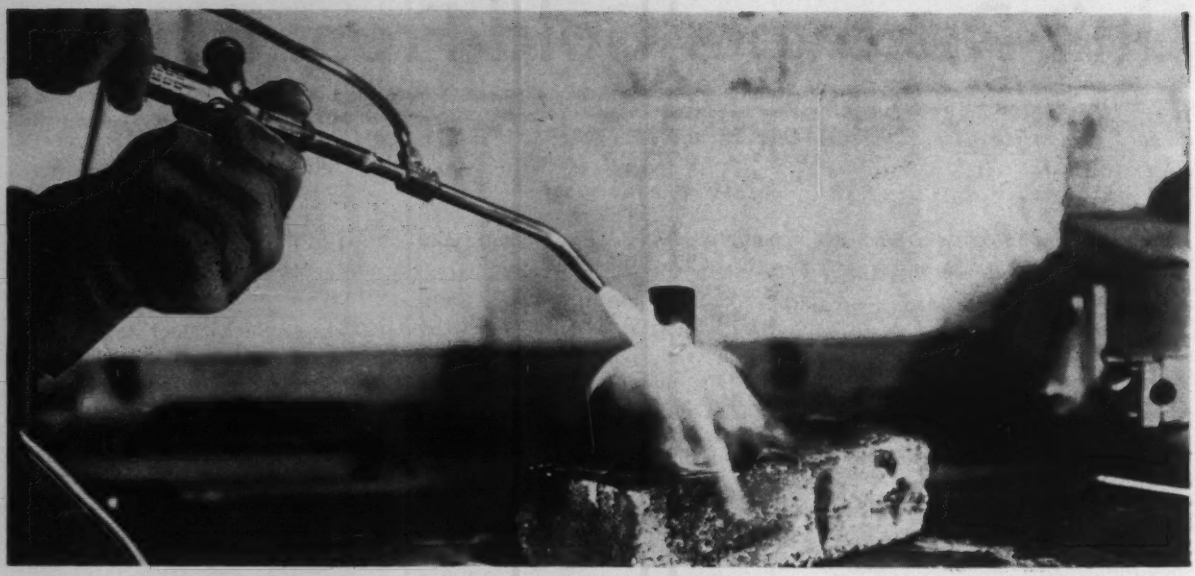
Free Service—Another first for the company is its new Precious Metals Plating Research Center. Its purpose? To serve industry. The pilot plant has a series of seven-gallon tanks with accurate control on temperature, voltage, amperage, time and solutions. Each of the seven tanks is jacketed with insulation to provide even heat. Each has an independent source of controlled electrical power.

The research center's engineering and scientific staff, electroplating library, and testing facilities are available without charge to any company or engineer with precious metal plating projects or problems.

Laboratory results are not always duplicated under production conditions. For this reason, the pilot stage was set up to end the uncertainty, time and expense usually found in the transition from beakers to tanks.



PILOT SETUP: This neatly arranged pilot stage ends the uncertainty that usually results when laboratory setups are placed in production.



COST CONSCIOUS? This base joint of a tubular leg cost 1½ cents to braze. Setup time is only 30 seconds.

New Controls Spur Spray Brazing

Vibratory Dispenser Gives Uniform Metal-Powder Flow

Metal to metal surfacing with a hand torch takes on new flavor with specially designed controls.

Bothersome problems of flashback, caking and turbulence have been eliminated.

▪ Spray brazing takes on a bit of class by using something old and something new. The process has been around awhile but its control left much to be desired.

Air Reduction Co., New York, developed a new method of metal to metal surfacing called Aircospray. The process permits powered metals to be sprayed and fused simultaneously on a base metal by means of an oxyacetylene flame.

Alloys of greater hardness can be compounded in powered form much easier than the standard rod form. For this reason the process is well suited for hardfacing jobs or where deposition of powdered metals of a high melting point is needed on a base metal of lower melting point.

What's Needed—Basic element of the spraying process is a standard oxyacetylene welding outfit with a modified tip. This special tip permits the powered metals to be sprayed through the flame.

Other parts needed are a carrier gas source, a means of dispensing and carrying the powdered metals to the torch tip and the necessary controls. The carrier gas may be argon, helium, nitrogen or CO_2. Either acetylene or natural gas can serve as the fuel.

Caking and turbulance are no longer a problem in the process A new vibrator dispenser and flowmeter control holds these factors in check.

Tip Mixer — The specially designed tip simultaneously permits passage of the oxy-fuel mixture and the powered metal into the flame. Two separate channels in the tip prevent costly flashback problems.

The fineness and uniform emission of the powdered metals make it possible to deposit surface coatings as thin as 0.003 in. This is a labor-saving factor, especially if grinding is needed to bring the product to desired size.

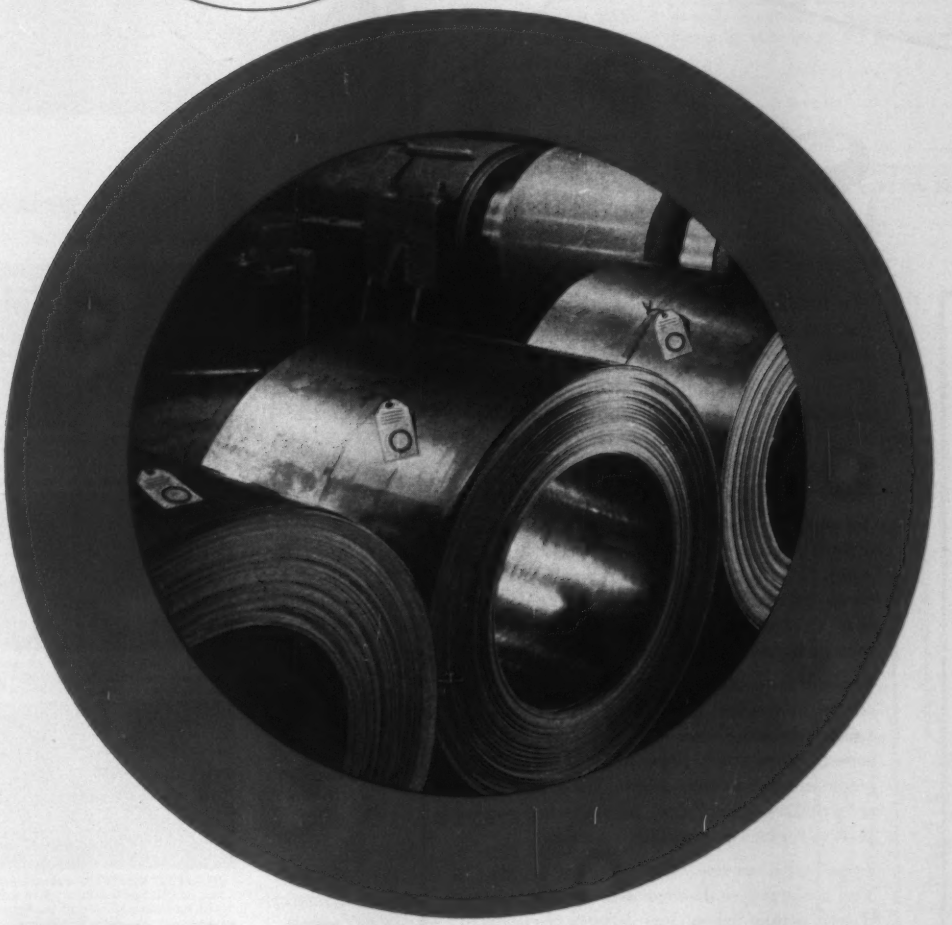
How It works — The solenoid switch in the operator's hand gives him complete control as he heats and fuses the material. The switch actuates both the metal powder and the carrying gas.

The operator preheats the part to be brazed and then presses the remote control switch on the torch handle. This allows a limited amount of metal powder to flow through the tip. The metal powder thus begins fusing to the base metal.

The process lends itself to many uses. A few of these include overlaying of hardfacing material on automotive valves, saw-blade guides and any other sliding surfaces.

COVER YOUR SPOT REQUIREMENTS

with RED CIRCLE SERVICE from Acme-Newport



Any sudden gap in your steel inventory suggests a rush order to Acme-Newport for preferential *Red Circle Service*. Your order bears a bright red circle that alerts the entire organization to your need for speed. This unusual service is the result of flexible operation and scheduling, modern equipment, and a series of laboratory checks that maintain highest quality even under pressure. When you need it good and you need it fast, ask Acme-Newport for *Red Circle Service!*

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Hot Rolled Steel in Coil	Cold Rolled Steel in Coil (*full hard only*)	Plates (5/16" *and lighter*)
Hot Rolled Pickled Steel in Coil	Cold Rolled Sheets	Electrical Sheets
Hot Rolled Sheets	Alloy Sheets and Plates	Electric Weld Line Pipe
Hot Rolled Pickled Sheets		Spiral Welded Pipe

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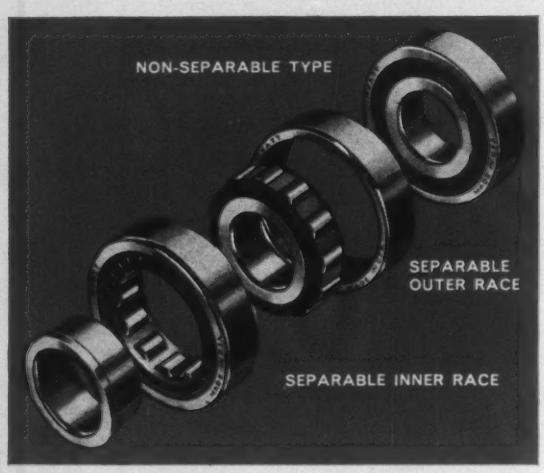

SERVICE

The fundamental difference in the service you get from one supplier or another can usually be traced to people.

HYATT has been fortunate to build an organization which contains the kind of people who make this difference apparent in the way that they make, sell and service Hyatt Bearings.

No one, for example, knows more about cylindrical bearings than Hyatt Sales Engineers. The experience and knowledge of these trained bearing specialists regularly save vital man-hours and dollars for customers in almost every kind of industry.

You will appreciate their painstaking study of your individual problems of how best to apply a bearing. You will appreciate their conscientious study prior to every bearing recommendation they make. These factors are a dollar-saving "plus" for you when you need to replace or install new bearings.

Some call it service. Hyatt calls it people. You are urged to discover the difference in Hyatt people when you have a bearing problem. It's yours for the asking.

2

RELIABILITY. Hyatt's Reliability Program embraces every phase of product development . . . and that starts with nothing less than the highest-grade raw materials.

3

PRICE. Hyatt's advantages of quality, assembly practice and uniformity of product can often reduce over-all cost to you.

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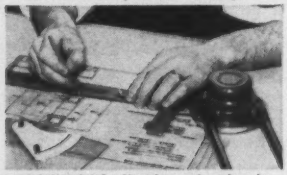
DELIVERY. Hyatt's unsurpassed production facilities deliver bearings in quantity with maximum speed and economy.

5



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FOR MODERN INDUSTRY

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Metal Spinning

A series of bulletins covers case histories of a broad variety of metal-spinning jobs. They are complete with technical data. Covered are unusual spinning jobs in the military, industrial and other fields. (Spincraft, Inc.)

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Strip and Bar Shears

Specialized shears for strip and bars are dealt with in a four-page bulletin. The bulletin presents data on mill-mounted shears, up-cut and down-cut strip shears, and on a series of bar shears. (Curry Air Shear Corp.)

For free copy circle No. 2 on postcard

Inspection Lights

A bulletin describes and illustrates 12 types of inspection lights. The four-page bulletin also includes a listing of 15 styles of miniature lamps with their electrical characteristics and dimensions. (Welch Allyn, Inc.)

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Inclinable Presses

Open-back, inclinable presses are described in a 20-page bulletin. Press construction, slide construction, inclining mechanisms and lubrication arrangements are covered completely. (The Minster Machine Co.)

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Adhesives Selection

A discussion of the selection of adhesives, bonding techniques, testing methods and a glossary of adhesive terms are contained in an engineering bulletin. A table in the bulletin lists the most common causes of bond failure. It also recommends remedies for such failures. (Raybestos-Manhattan, Inc.)

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Chemical Feeder

Corrosion resistant, a unit for feeding solutions of chemicals into water systems is the subject of a bulletin. (Hagan Chemicals & Controls, Inc.)

For free copy circle No. 6 on postcard

Gate Operators

A complete line of operators for all types of gates is illustrated and described in a four-page booklet. Its features and specifications are also contained. (Robot Industries, Inc.)

For free copy circle No. 7 on postcard

Monitoring Systems

In two-colors, a 12-page brochure describes facilities of the company. They are the engineering and production of advanced ultra-reliable systems for high-speed process monitoring, production testing and automatic checkout. (Monitor Systems, Inc.)

For free copy circle No. 8 on postcard

Plain Grinders

Listing features and condensed specifications, a six-page bulletin illustrates and describes 10- and 14-in. plain cylindrical grinders. (Landis Tool Co.)

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Teflon Hose Assemblies

Hose and reusable fittings, that can be made up into assemblies on the job with ordinary hand tools, are described in a bulletin. (Anaconda Metal Hose)

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Vertical Storage

Vertical storage and handling of sheets, coils, bars, drums and palletized material are illustrated

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FREE LITERATURE

and described in a catalog. Detailed installation photographs and descriptive text offer valuable information to readers planning new material-handling installations. (Chicago Tramrail Corp.)

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Heat Treating Furnace

In full color, a four-page brochure describes a continuous, controlled atmosphere furnace. The furnace heat treats cold-finished bars. (Jones & Laughlin Steel Corp.)

For free copy circle No. 12 on postcard

Tools and Fabrication

Various tools and fabrication facilities of the manufacturer are described in a 16-page catalog. The foundry pours both Meehanite and Ni-Hard metal, specializing in "pit-molded" castings. The machine shops contain large tools. (Hardinge Mfg Co.)

For free copy circle No. 13 on postcard

AC Voltmeter

Highly-accurate, an ac voltmeter has its features and application described in a two-page data sheet. Specifications, dimensions and prices are detailed. (General Electric Co.)

For free copy circle No. 14 on postcard

Stand-Off Fasteners

Information on all types of stand-off fasteners is offered in an illustrated 20-page booklet. The fasteners are used to support tubing, wire bundles, conduit, equipment and instruments. (Western Sky Industries)

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Rotary Knife Cutter

Full details on a precision-built, rotary knife cutter are given in a specification sheet. The cutter granulates polyethylene and polypropylene film. (Sprout, Waldron & Co., Inc.)

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Coil-Handling

The subject of a four-page descriptive bulletin is coil-handling equipment for coils of strip steel. This includes coil grabs and coil hooks. The bulletin gives complete specifications and has a number of action photos showing equipment use and safety. (Dixon Automatic Tool, Inc.)

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Split Case Pumps

Vertical, two-stage split case contrifugal pumps are illustrated and described in a bulletin. Capacities of the pumps range to 1400 gpm and heads to 425 ft. (Aurora Pump Div., The New York Air Brake Co.)

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Ammonia Dissociators

Described in a brief catalog are ammonia dissociators. The catalog includes a flow diagram and details unusual construction features. (Rolock Inc.)

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Precision Drilling

An automatic, six-spindle turret drilling and tapping machine is illustrated and described in a bulletin. The machine speeds production of precision drilling. It maintains 0.0005 in. hole centers. The bulletin gives specifications. (Burgmaster Corp.)

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Projection Welding

Projection welding of low carbon steel with embossed projections is dealt with in a 20-page brochure. Given is detailed information on techniques, projection forming tools, welding electrodes and joint design. (The Taylor Winfield Corp.)

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Graphite, Carbon Felts

Information, on eight grades of plain and reinforced graphite and carbon felts, is presented in a bulletin. Data on permeability, resistance, density, strength, gage and weight are tabulated for the four grades each of graphite and carbon felt. (National Carbon Co.)

For free copy circle No. 22 on postcard

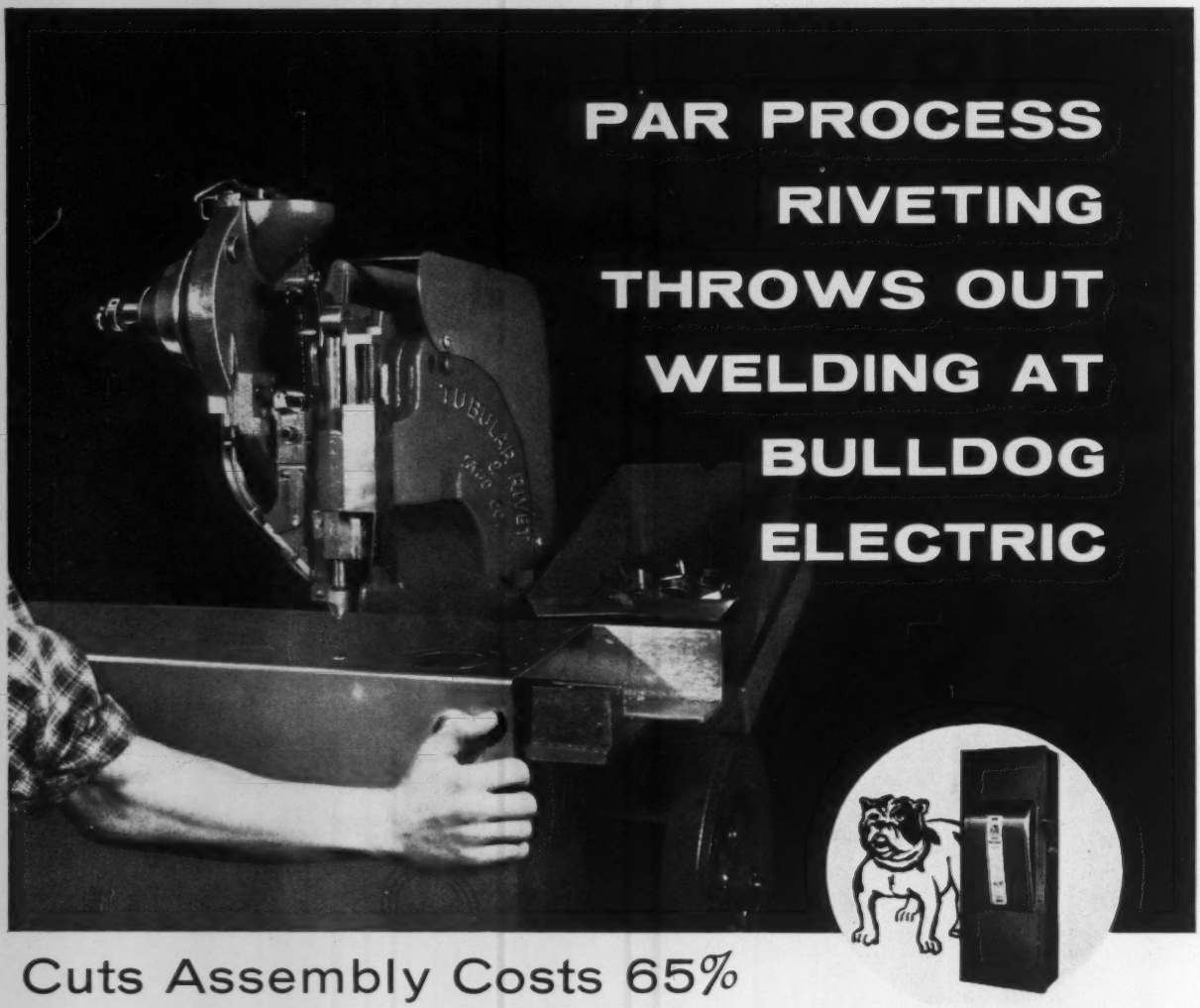
Cam Contouring

Air operated, a cam contouring machine is dealt with in a two-page bulletin. The bulletin lists ten design features in detail. The literature also provides complete specifications; also a dimensional specification diagram. (Olofsson Corp.)

For free copy circle No. 23 on postcard

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA



Cuts Assembly Costs 65%

At BullDog, TRS riveting replaced arc welding in assembling components of Vacu-Break® safety switch boxes . . . with an overall saving of 65% in assembly costs. Previously, twelve arc welds were used to secure the two spring stops and mounting rails of each switch box. Special fixtures were required to support parts in the box during welding and after welding was completed the fixtures had to be dismantled. The entire operation was costly and time consuming.

Trained in the PAR Process approach to cost reduction, the TRS man saw that an automatic riveting set-up could be devised to simplify and speed the work. A roller support was designed to carry the weight of the box, and position the parts for twelve fast operations of a standard TRS automatic riveter. Other details of rivet design, tooling, and setting sequence were quickly solved with the aid of PAR Process know-how. Riveting produced an equally strong assembly and permitted visual inspection of fastenings to assure security.

FIND OUT what the PAR Process can save you
The PAR Process aims at lower costs and higher production rates. It starts with a sharp-eyed, production line search by your TRS man, for ways to eliminate or simplify and speed up steps in assembly. It is made effective by specially organized TRS procedures, backed by unique TRS developments in rivets and riveting machines.
The PAR Process may bring you better integration and fuller automation of assembly operations, or even a cost-cutting change in basic assembly method as with BullDog. Ask for a check of your operations. Whether your assembly jobs are simple or complex, it can be worth dollars to you.

Don't Buy Riveting Machines until you learn how the TRS **PAR** *process revolutionizes riveting*

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QUINCY 70, MASSACHUSETTS • **TRS** SALES OFFICES: Atlanta • Buffalo • Charlotte • Chicago Cleveland • Dallas • Detroit • Hartford • Indianapolis • Los Angeles • New York Philadelphia • Pittsfield • Quincy • St. Louis • Seattle. WAREHOUSE IN CHICAGO
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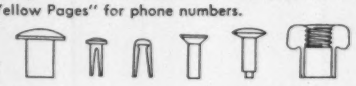


New Patents In Metalworking

Zinc-Coated Articles

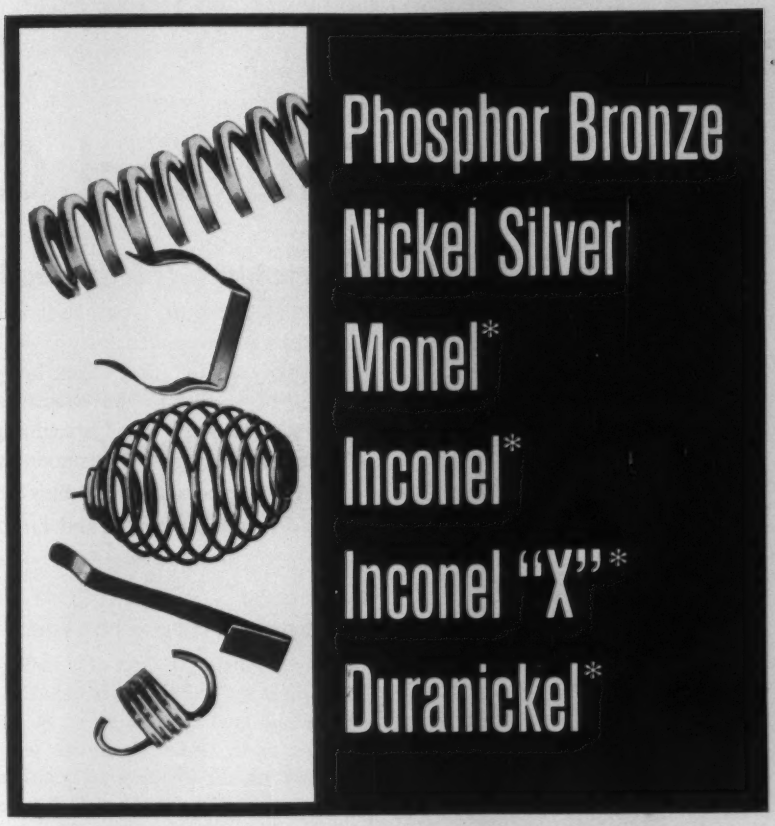
Galvanizing furnace, K. Fritz, Nov. 1, 1960. A furnace has a lid-heated ceramic galvanizing pot. It is for use in the immersion coating of metal articles with zinc, without limitation as to size or cross-sectional shape of such articles. No. 2,958,520.

Steel Making

Manufacture of steel, T. C. Churcher (assigned to British Oxygen Co. Ltd., a British company), Nov. 1, 1960. In the manufacture of steel, a plurality of fine streams of iron from a blast furnace or cupola are allowed to fall through a vertical reaction chamber in contact with oxidizing gas and steam. The treated metal is converted to steel in a steelmaking furnace. Fume-laden gas from the reaction zone is used in the blast furnace or cupola. No. 2,958,597.

Cold-Worked Parts

Method of making cold worked and aged products which are substantially free of objectionable lamellar constituent, from precipitation hardenable ferrous base alloys, K. Metcalfe (assigned to Cyclops Steel Corp., Bridgeville, Pa.), Oct. 25, 1960. In the production of cold worked and aged jet engine or gas turbine parts, the alloy used consists of 24-28 Pct Ni, 12-16 pct Cr, 1.35-4.5 pct Ti, up to 0.15 pct B, up to 0.2 pct C, up to 2 pct each of Al and Si, up to 3 pct Mn, up to 5 pct Mo, up to 1 pct V, up to 0.5 pct Zr, up to 2 pct Cb plus Ta, and the balance essentially all Fe. This alloy is solution heat treated at 1650-1800°F, quenched, cold worked, solution treated at 1950-2200°F, quenched and aged at 1300-1400°F. No. 2,957,790.



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Riverside-Alloy Metal is your *one* source of the world's finest, most uniform spring material . . . round or flat. And now, we add ISOLOY stainless steel!

Stainless is *not* a new material for Riverside-Alloy. But ISOLOY *is* a new trade name. The name ISOLOY was coined so that on specifications you can differentiate Riverside-Alloy stainless spring wire from wires made to conventional standards of uniformity. Regardless of test or comparison, ISOLOY exhibits uniform temper, dimensional size, grain size, tensile strength and coating.

Check it now. For complete information, prices and delivery of ISOLOY or other spring materials and a copy of the new "Spring Materials Digest," write: *Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N.J.*

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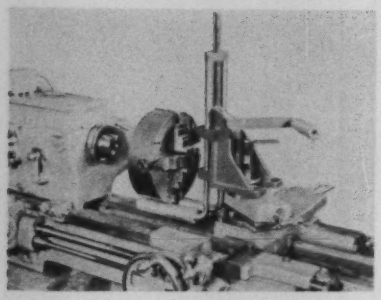
H.K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.

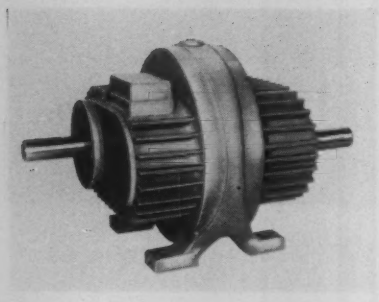
New Materials and Components



Portable Lift Handles Lathe Chucks, Faceplates

A tool mounts or dismounts chucks and faceplates for lathes. It is equally useful for putting heavy pieces of steel into the chucks or between centers for machining. When mounting or dismounting chucks or pieces of steel, they are placed on the two rollers and can be rotated into position. It can also be used on turret lathes. The chuck lift fastens to the compound of the lathe with the use of the tool post and bar of steel furnished. Capacity of the lift is chucks up to 18 to 20 in. in diam. The lift weighs only 20 lb. (Easton Tool & Machine Works)

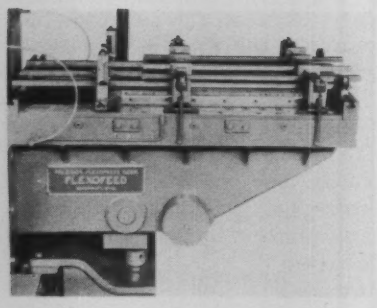
For more data circle No. 25 on postcard, p. 121



Transmission Provides High-Speed Positioning

Instantaneously reversible, a 5-hp transmission affords high-speed positioning and sequencing. It reverses in 0.2 seconds under worst conditions. It is ideal for applications to machine tools and automation and servo systems. The unit consists of an input and output shaft. A gear or chain drive connects them. Engaging one clutch provides chain drive—for the same-direction rotation of the output shaft compared to input shaft. Engaging the other clutch produces gear drive — for opposite-direction rotation of the output shaft. (Airborne Accessories Corp.)

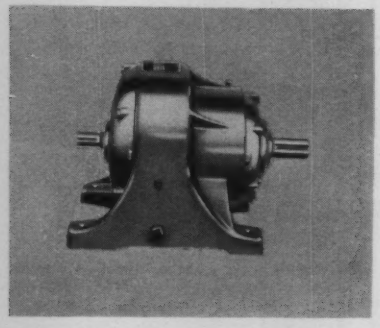
For more data circle No. 26 on postcard, p. 121



Feed Keeps Press Running at Top Productivity

For use on the manufacturer's presses, a feed unit feeds cut blanks and coil strip interchangeably and equally well. Adjustment can be made from one to the other often. It does this in as little time as it takes to switch dies in the press. Various feed units cover a wide range of feed lengths and speeds, with accuracy down to ± 0.002 in. On some applications, coil stock can be fed at 2500 ipm. Blanks can be fed as high as 300 per minute. The frame, gearing and linkage of the feed remain permanently mounted to the press. (Precision Welder & Flexopress Corp.)

For more data circle No. 27 on postcard, p. 121



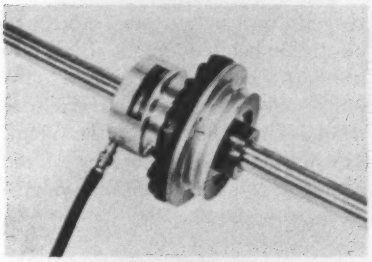
Rugged Speed Reducers Fit Into Limited Space

Double reduction speed reducers incorporate an improved gear arrangement for low speed, high-torque, extra capacity working performance. The reducers come in two types of gear train construction. One has normal reduction gear train, and the other is double reduction with a duplex gear arrangement. Fully hardened, helical gears give maximum speed reduction. They eliminate gear breakage caused from heavy-duty loads. The reducers are designed to be driven by a separate, direct - connected motor. A solid, cast, one-piece, cast-iron housing eliminates misalignment problems. (U. S. Electrical Motors Inc.)

For more data circle No. 28 on postcard, p. 121

Air Clutch

For applications up to 10 hp, an air clutch has an unusual mounting arrangement. It permits attachment anywhere on a shaft or to a motor. The unit is self-adjusting and is both a clutch and motor sheave.



No rotary joint is needed. It hooks to air line. Control can be manual or automatic with special control panel attachment. The clutch provides shockless starts without overheating. (Horton Mfg. Co., Inc.)

For more data circle No. 29 on postcard, p. 121

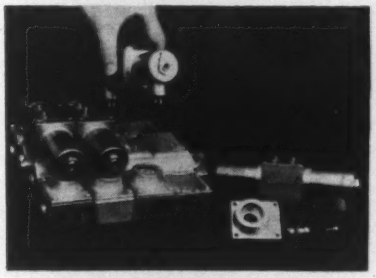
Grinding Base

Surface burning, often a problem in plunge grinding, is eliminated with a new water-soluble grinding base. It features high lubricity to prevent burning the ground surfaces. The product makes a transparent emulsion at 50:1 dilution with water. It does not form heavy deposits on the machine. (Baker/Gubbins Co.)

For more data circle No. 30 on postcard, p. 121

Manifold Air Valves

A stacking manifold air valve saves direct labor costs on valve maintenance and replacement. The valve comes in single and double solenoid models; two or three position, three or four way. Sizes are ¼-, ⅜- and modified ½-in. sizes. The valve proper lifts from the manifold plate by removing four bolts.



We'll bring STRIPPIT's cost-cutting demonstration to you

Here's the newest STRIPPIT Mobile Demonstrator Unit, equipped with actual operating STRIPPIT metalworking equipment. Every day, throughout industrial America, we welcome aboard scores of production men and company executives for on-the-job proof that the STRIPPIT way is the most efficient and economical way to punch holes.

These men (center) are watching the STRIPPIT Super 30 Fabricator in action, punching out a complex hole pattern from a template mounted on the integral Duplicator. Time studies conducted in customer's plants have shown savings in production time of 60% to 80% over conventional methods.

The STRIPPIT Flex-O-Drill (bottom) eliminates the need for base line drawings and vernier height gage layouts in the production of precision templates and sheet metal layouts. Also on display in the Demonstrator are a variety of STRIPPIT self-contained hole punching units.

One of these Mobile Units is in your part of the country now. Write or call Wales STRIPPIT and ask them to put your plant on the itinerary.

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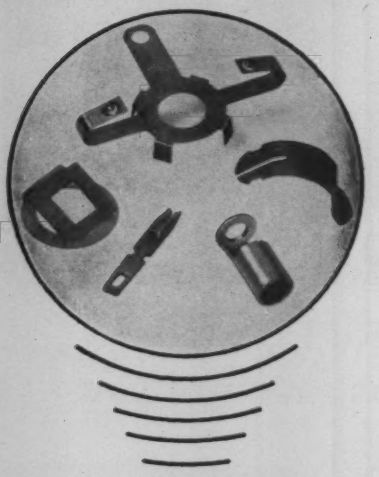


Somers THIN STRIP

PHOSPHOR BRONZE

From .000125" thin to .010", Somers Thinstrip phosphor bronze is produced by a unique high-speed annealing process which provides a uniform *fine grain* structure. Thus, spring temper metal is produced with elongation up to five times that of coarse grain methods, making possible the forming of much more intricate parts for many instrument and electro-mechanical applications. And Somers' close control of grain size guarantees prolonged fatigue resistance unattainable through ordinary methods.

Whatever your Thinstrip problems, in copper, copper alloys and stainless steel from .010" down and nickel and nickel alloys from .020" down, write for the Somers confidential data blank. No obligation, of course.

FOR EXACTING STANDARDS ONLY

Somers THIN STRIP

Somers Brass Company, Inc.
102 BALDWIN AVE., WATERBURY, CONN.

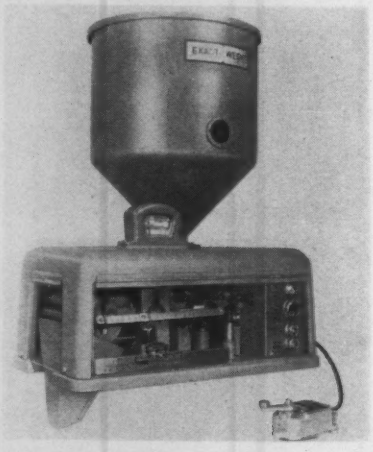
DESIGN DIGEST

The valve solenoids plug into electrical connections located in the manifold plate. The same manifold stack will accept both the two and three position valves, as well as three and four way valves, and also all three valve sizes. (Beckett-Harcum Co.)

For more data circle No. 31 on postcard, p. 121

Weigh-Feeder

For small capacity plastics injection molding machines, a weigh-feeder has a maximum weigh bucket capacity of 10 oz and under. The weigh-feeder mounts on the molding press in place of the regular volumetric hopper. The feeder automatically weighs and delivers



plastics charges to the press with precision accuracy. The weigh-feeder consists of a precision scale with over-and-under indicator; 50-lb capacity spun aluminum supply hopper; stainless steel net weigh hopper and dump mechanism. (The Exact Weight Scale Co.)

For more data circle No. 32 on postcard, p. 121

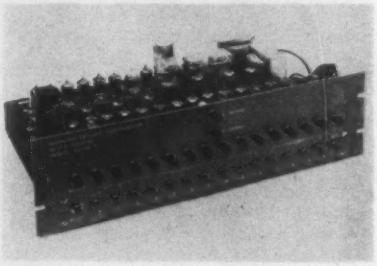
Metal Cut-Down

Long lasting, a neutral abrasive compound can be used with any type of media for cut-down of both ferrous and nonferrous metals. Closely screened, the aluminum-oxide base compound contains grease and oil emulsifiers, water softeners, rust inhibitors and abrasive materials. It can be used in self tumbling as well as with all types of barrel-finishing media to generate radii, improve micro-inch finishes and deburr. (King-Seeley Corp.)

For more data circle No. 33 on postcard, p. 121

Batch Counters

Economy, dependability and rugged construction are features of electronic batch counters. Built into standard electrical cabinets, the units will withstand their environmental surroundings in the plant. The normal life expectancy of the counters is about a billion opera-

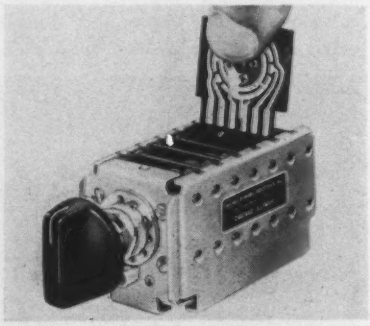


tions. The counters operate in almost every instance where other electrical or mechanical registers often fail. The counters make simple, preset count, according to specifications and requirements, at higher rates of speed than the mechanical or electrical registers. (Gyra Electronics Corp.)

For more data circle No. 34 on postcard, p. 121

Rotary Switch

Small in size, a rotary switch features instantly-removable wafers without disassembly or unsoldering. This means immediate cleaning or replacement. The switch can be

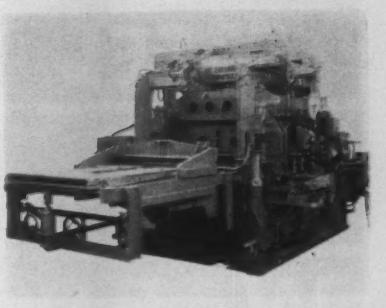


supplied to meet MIL-3786 or commercial applications. Operation is manual or motor. (Chicago Dynamic Industries)

For more data circle No. 35 on postcard, p. 121

New Equipment and Machinery

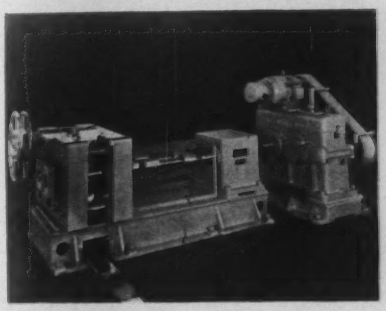
Unit Welds Heavy Strip for Continuous Processing



A welder produces a sound weld, trimmed smooth to the strip thickness. It is suitable for further cold reduction in the same manner as the parent strip material. Large coils, built up by flash welding in steel mill pickle lines, will contain less off-gage material. Higher tonnage can be achieved in later rolling and processing. After flash-butt welding and trimming, this machine automatically notches or clips the edges of the strip at the weld. It does this to remove sharp protrusions which are a hazard to following high-production operations. (The Taylor Winfield Corp.)

For more data circle No. 36 on postcard, p. 121

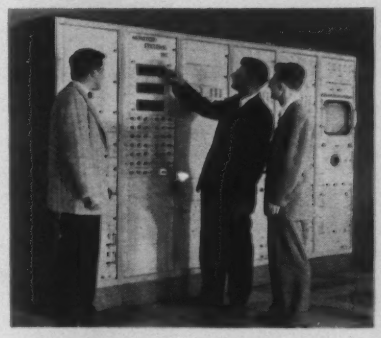
Mill Produces Nickel Strip from Powder



With patented edge control, a horizontal compacting mill makes possible a powder rolling method of thin gage strip. The machine employs 10-in. diam x 8-in. wide rolls made of alloy tool steel. The two rolls are mounted side by side. In operation, fine metal powder is continuously fed into the mill through a hopper equipped with flow controls. Green strip leaves the mill on an exit chute. It is passed continuously into a protective atmosphere sintering furnace. It is given a reduction. Purity of the original powder limits purity of the strip. (Loma Machine Mfg. Co.)

For more data circle No. 37 on postcard, p. 121

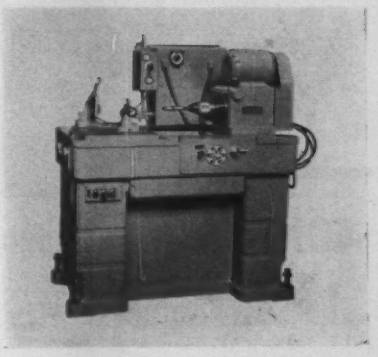
Monitor System Performs Own Troubleshooting



With a scanning rate of up to 5000 inputs a second, a high-speed automatic monitor system has self-checking features. The solid-state system measures temperatures in voltage form and rate of change of temperatures. It compares both to preset values. It converts to digital form for readout in binary decimal code and cathode ray tube display. The system also monitors irrational high and low temperatures and approach-to-trip. Scanning rate is adjustable to 5, 2.5, 0.5 kc or manual. Logic of the checking channels provides automatic localization of failures. The present system is expandable to 3600 inputs. (Monitor Systems Inc.)

For more data circle No. 38 on postcard, p. 121

Hydrohoner Design Has Automation Potential



The design of a hydrohoner simplifies changeover from one job setup to another. The machine provides a first rate vehicle for obtaining the microhoning benefits. These benefits are: efficient stock removal; accurate geometry and controlled surface finish. The basic machine has: hydraulic initial tool expansion and collapse; adjusting head for manual tool feed expansion and stonewear compensation; adjustable speed belt drive for spindle rotation; rigid work table support; provisions for gravity coolant drainage. By adding the manufacturer's package units, the machine can be fully or partially automated. The bridge is stationary. It accommodates work fixtures and optional equipment. (Micromatic Hone Corp.)

For more data circle No. 39 on postcard, p. 121

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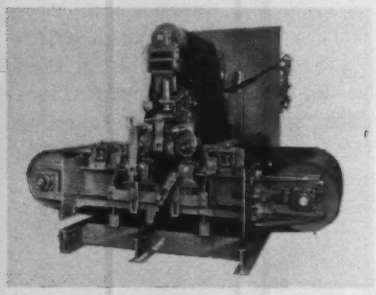
NEW EQUIPMENT

Sheet Polisher

Speeding production, a sheet polishing machine uses an unusual concept in abrasive belt polishing. A single, endless abrasive belt makes contact with the work twice in one pass. This provides double



the surface finishing ability of standard, single-contact flat polishing machines. The machine uses a 60-in. wide, single motor-driven abrasive belt. The belt may be operated dry or with a mist spray or belt greasing to produce decorative finishes. Endless conveyor belt is of vulcanized, six - ply, high - friction, oil - resistant neoprene. Selective drive speeds are from 20-60 fpm. (Murray-Way Corp.)

For more data circle No. 40 on postcard, p. 121

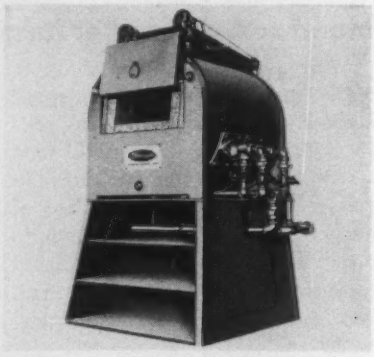
Measures Width

A tiny micrometer measures width dimensions. The model permits direct measurements of internal groove and land widths in bores as small as ¼-in. diam. The instrument can also be used to check workpieces without the necessity of removing them from the machine. This micrometer replaces as many as six different conventional measuring devices formerly required to set up and check under-cut machining operations. (Navan Products, Inc.)

For more data circle No. 41 on postcard, p. 121

Wide-Range Furnace

The principal feature of a furnace is a temperature range of 300°-2400°F. It can be used for practically every heat-treating process. Both ferrous and nonferrous alloys may be heat treated under accurate



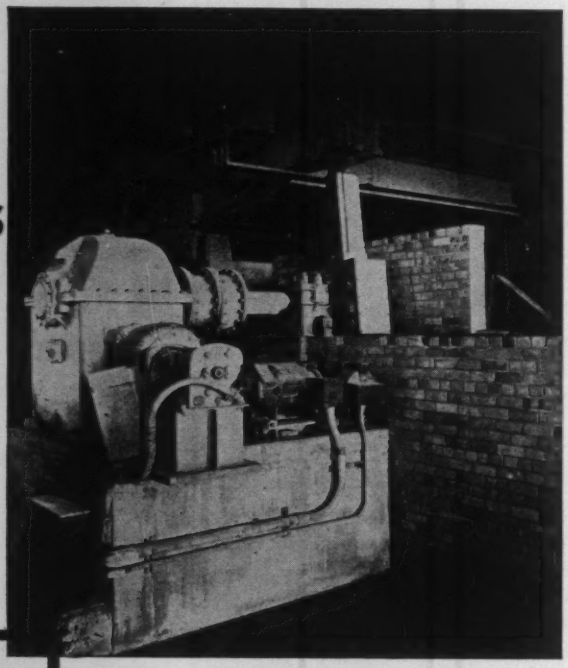
temperature control. Burners have a 95-pct turndown ratio for close temperature control and heat distribution. (Sunbeam Equipment Corp.)

For more data circle No. 42 on postcard, p. 121

Mill Lining Bricks

Tongue - and - groove mill lining bricks insure secure fit of mill linings. The bricks form a unitized, longer wearing lining with less "pick-up" from wear. They come

Tilting
700-tons
of steel
furnace



CONE-DRIVE
GEARS
DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

Here's a closeup of tilting mechanism for an electric furnace. Standard, stock model, double-reduction Cone-Drive **double-enveloping worm** gear speed reducer tilts furnace and heat with combined weight of 700 tons.

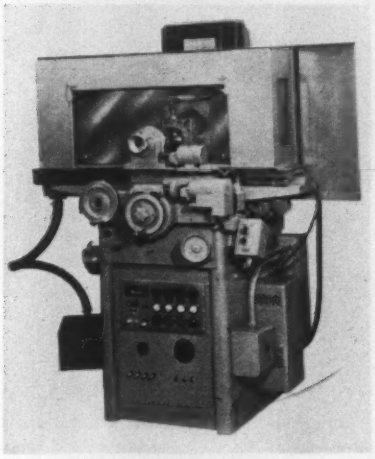
Powerful Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

in 1½-, 2- and 2½-in. thicknesses. They are 6-in. long. The high-density, alumina bricks, make it possible to install thinner linings in larger size mills. This increases the capacity and reduces weight. (McDanel Refractory Porcelain Co.)

For more data circle No. 43 on postcard, p. 121

Slicing Machine

For slicing silicon or germanium wafers, an automatic slicing machine answers the needs of the semiconductor industry. The re-

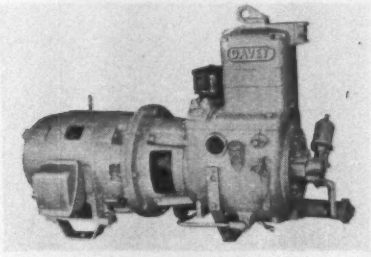


peatability accuracy of the cross feed index to within ±0.0001 in. is controlled. The table is driven by a two-speed dc motor. (Reid Bros., Inc.)

For more data circle No. 44 on postcard, p. 121

Industrial Compressors

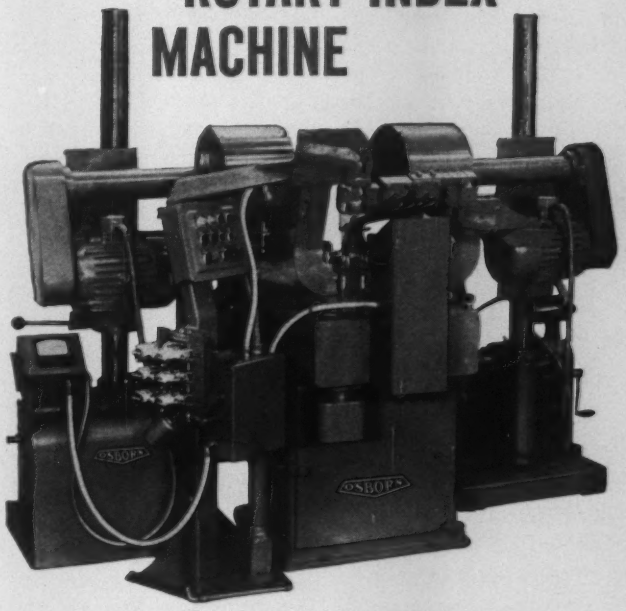
Oil-cooled, industrial, stationary rotary compressors have a new type oil separator. The separator contains an inorganic fiber glass element. It accumulates fine particles



of oil that drain back to the intake section of the compressor. It does this by means of a pressure-reducing oil return valve. The compressors

to cut your metal finishing costs—

OSBORN AUTOMATIC ROTARY INDEX MACHINE



features "building block" components arranged for completely automatic finishing cycles

An automatic part load/unload and turnover mechanism is the latest addition to Osborn's Rotary Index metal finishing units. This feature eliminates the need for production machine operators—and means regulated work flow plus higher production rates.

Most significant feature is the use of a *standard* index table and *standard* finishing heads easily tailored for efficient, economical *automated finishing* operations.

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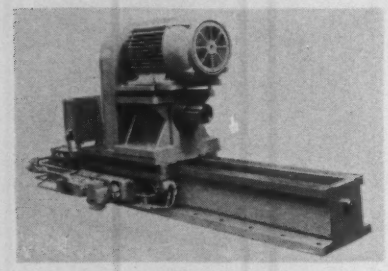
come in 2- to 125-hp sizes. (Davey Compressor Co.)

For more data circle No. 45 on postcard, p. 121

Gun Drilling Unit

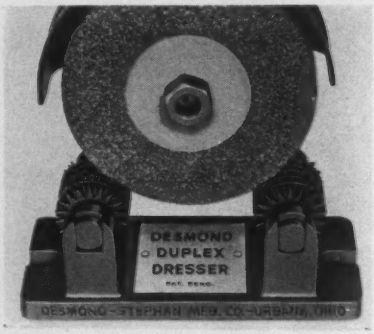
A gun drilling unit has a 36-in. stroke, timing belt drive and self-contained hydraulic controls. The drill capacity of the unit is ½-2½ in. Revolutions per minute are 1055-6900. Feed rate is infinitely variable from 0.0001-0.025 in. per revolution. High-speed, single-spindle gun drilling head and ball bearing are oil mist lubricated, with coolant inducted through spindle. (Motch & Merryweather Machinery Co.)



For more data circle No. 46 on postcard, p. 121

Duplex Dresser

With a double cutter unit, a grinding wheel dresser dresses and trues straight-faced grinding wheels used on flexible shaft and portable grinders. It dresses wheels of from 4-8 in. in diam without removing them from their spindle. The revolving wheel is cradled between the cutter units for a few seconds. The face of the wheel dresses straight, load is removed and the wheel's original fast cutting action is restored. (Desmond-Stephan Mfg. Co.)



For more data circle No. 47 on postcard, p. 121

pH Meter

Line-operated, a drift-free instrument makes precise pH or millivolt measurements. It finds use in any laboratory where fast, accurate pH measurements of liquids, pastes or semi-solids are required. It measures over the full 0-14 pH range and offers direct millivolt readings to ±1400 millivolts. The instrument features simply-operated push-button controls. (Beckman Instruments, Inc.)

For more data circle No. 48 on postcard, p. 121

Vibratory Polishing

A polishing machine gives surfaces free from scratches, smears, shadowing, loosened grains and rounded edges. An operator simply sets the mounted samples in the polishing bowl and turns the machine on. After adjusting the amplitude, he is finished. (Fisher Scientific)

For more data circle No. 49 on postcard, p. 121

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Some Optimism Now Reflected

It may be just another false start, but the recent pickup in orders continues to hold.

On the negative side, the automotive outlook is not as good as new cutbacks come from Detroit.

■ The slight pickup in steel orders that began a few weeks ago is still continuing. But steel sales officials are still trying to decide if this gain is a reaction from a poor December or the start of a real upturn.

It is too soon to tell if the pickup is genuine. But January orders are ahead of what December bookings were at this time last month. And February looks better than January did this far ahead.

Is It Seasonal?—The improvement may be largely seasonal. December will be the worst month of the year, with operations over Christmas and New Year's probably dropping below 40 pct of capacity. After that, orders now reaching the mills suggest a normal improvement in January.

Four factors suggest a better tone in the steel market:

1. The seasonal decline in tinplate explains part of the December slump.
2. Year-end inventory cutting.
3. Some steel users, notably the smaller plants, have slashed stocks drastically; some are now beginning to place orders through the first quarter.
4. There's been a pickup in orders from farm equipment makers.

Trouble in Detroit—Against this, there is not much optimism in Detroit. With some automakers reducing orders, setting them back, or actually cancelling, few steel men expect any good news from that direction in the near future.

Sales of new cars are being hurt by cleanup deals on unsold 1960 models. And so far in this model year, compacts have taken 35 pct of production, but only 30 pct of sales.

Tough Specifications — Further, Detroit is tightening up on specifications on stainless steel and some other products, nuts and bolts, for example.

Stainless trim on the 1961 models will be even better than ever because of new and more rugged tests for good surface. (For more on stainless automotive developments, see p. 78.)

The general tightening of specifications, automakers say, is the direct result of the longer guarantees on new cars. Also, with business like it is, they know they can be tougher and get away with it.

Looking Ahead—If there is to be a definite upturn in steel this spring, it is likely to start in March. A seasonal upturn in tinplate, construction, and rails, coupled with a reversal in the inventory-cutting trend, could put the operating rate in the 60's. That is, if the steel capacity figure is still in use at that time. (See p. 80.)

Products showing some signs of life include cold-rolled sheet and terneplate, cold-finished bars, and tool steel.

As a reflection of the depressed state of the steel industry, United Steelworkers president David McDonald early this week said steel employment has dropped below the bottom point of the 1958 slump.

Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
North East Coast	52.0	51.0	54.0	101.0
Buffalo	41.0	39.0*	53.0	104.0
Pittsburgh	46.0	47.0*	49.0	98.0
Youngstown	38.0	36.0	38.0	93.0
Cleveland	42.0	46.0	55.0	100.0
Detroit	62.0	63.0*	68.0	103.0
Chicago	50.0	52.0*	53.0	94.0
Cincinnati	55.0	53.0*	54.0	92.0
St. Louis	65.0	68.0*	63.0	110.0
South	52.0	53.0*	53.0	90.0
West	52.0	52.0*	48.0	96.0
U. S. Rate	48.7	49.0*	51.6	96.3

*Revised.
Source: American Iron And Steel Institute

Steel Output, Composite Prices

Production	This Week	Week Ago	Month Ago	Year Ago
(Net tons, 000 omitted)	1,387	1,396	1,470	2,726
Ingot Index				
(1947-1949=100)	86.3	86.9	91.5	169.7
Composite Prices				
Finished Steel, base (cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.32	$66.32	$66.32	$66.41
Scrap No. 1 hvy (Gross ton)	$28.50	$28.50	$28.33	$41.17
No. 2 bundles	$18.50	$18.50	$18.50	$27.50

Electric Motors: On and Off

Producers of electric motors vary in positions on the business cycle. Generally, the industry is in a lean period.

Prices are still soft despite additional labor costs.

■ Producers of electric motors stand at different stages in the business cycle.

In the fractional horsepower field, producers feel they are running ahead of the overall economy. The slump started early this year in this field. Feeling now is that the revival will come in February—four or five months before the general upswing.

For integral horsepower motors, business has trailed off. But a strong first half has made the full year a good one. Manufacturers are hoping for an upturn, but at least one major producer thinks 1961 will fall short of this year.

Early And Deep — The lag in fractional motors is blamed primarily on a disappointing year for appliances. Also, industrial sales are down, but not to the same extent as the consumer market. The unexpected dip in washer sales hit motor men early and cut deep.

There is still no sign of a pickup in retail buying of appliances, but finished stocks have been worked down. It will only take a slight nudge at the retail level to start the entire supply chain moving again. Motor men expect the upward push will reach them in February.

Plan Further Cutbacks — Meanwhile, manufacturers are riding out a lean period as best they can. Further production cutbacks and layoffs are planned by some centers soon. The whole industry is pushing to give rush service.

Raw material inventories of fractional motor plants are down—but not far enough. One plant has been attempting to liquidate stock, but production is dropping too rapidly. Even if business turns up in the first quarter as expected, no increase in steel buying is planned.

Prices have remained relatively firm in the fractional field. The general increase last year was washed out as far as the big consumer markets were concerned. However, motor men have refrained from the price cutting bouts that have always marked slow periods.

Prices Are Low Enough—"A dollar of profit is hard enough to come by in this industry," says one sales executive. "We've reached the point where we won't cut below the minimum to get business."

For integral horsepower motors, one producer sees sales following the general pattern of industrial activity.

"We never have really big business unless there is general expansion of industrial capacity."

Next year isn't expected to bring this kind of boom. With industry marking time, motor men see orders coming for replacement and modernization.

Integral motor prices are still soft. There have been no general increases this year, despite a hike in labor cost. Unofficial price cutting continues.

Fast Service Wanted—Producers are under heavy pressure to give fast service. They have built up field stocks of standard motors up to 50 hp. They're offering 3 to 8 week delivery of models requiring special manufacturing.

FAST SERVICE: Producers of electric motors are under pressure to give fast service. Some models requiring special manufacturing have delivery dates of three to eight weeks. Computers aid in rush deliveries.

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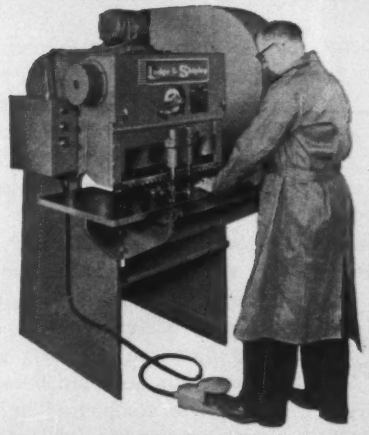

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October Shipments Trailed September

October steel shipments were slightly below September tonnage for this year.

But they were substantially ahead of the same period of 1959 when a strike curtailed output.

■ October shipments of finished steel products totaled 4,943,623 net tons, according to the American Iron and Steel Institute. This compares with 4,983,228 net tons shipped during September. In the year-ago period, when the steel strike was in effect, shipments totaled 1,419,297 net tons.

Total shipments through the first 10 months of 1960 were 62,543,780 tons, compared with 56,374,170 net tons for the same 1959 period, the Institute says.

Automotive and Sheets—Cold-rolled sheets accounted for 20.3 pct of shipments, the same figure as for the first 10 months of the year. Hot-rolled sheets made up 11.8 pct of the total, slightly more than the 11.3 total for the 10 months.

Automotive orders accounted for 23.4 pct of October shipments, several points higher than the 10 months average of 20.3 pct. Warehouses and distributors took 16.8 pct of the month's shipments, down from 17.6 pct for the entire period.

Sheet and Strip — Automakers have started another round of setbacks and cancellations, according to reports from **Detroit.** Chrysler Corp. has told mills to hold some tonnage out of January for possible rescheduling or outright cancellation. Ford Motor Co. has also cancelled some January tonnage.

However, this doesn't mean that January will be worse than December. **Pittsburgh** mills report a freshening of interest for the first quarter. Field offices report a pickup in optimism and activity. An exception: **East Coast** markets still aren't too active. At least one **Philadelphia** producer is cutting back sheet mill operations because of low demand for products.

Some forward buying has been noted in **Cleveland,** particulary from smaller users which have let inventories drop to two weeks or lower. While buying is spotty within individual industries in the **Midwest,** January bookings are trickling in at an improved rate. **Chicago** mills are talking of a 5 pct gain because of the relatively good rate of sheet and strip bookings. Farm equipment orders are fairly strong, and segments of the appliance market are showing improvement.

PURCHASING AGENT'S CHECKLIST

Stainless mills are swinging over to production of bright annealed stainless. P. 78

Is use of steel operating rate on the way out as way of measuring industry activity? P. 80

Study of world iron ore reserves, use, and imports shows interesting trends. P. 114

Bars—At best, the bar market is static. A bar mill in **Pittsburgh** says it can detect no improvement. Advance ordering has been practically nonexistent, and there's no trend away from this pattern. Consequently, mills won't have any real picture of January until the end of this month. And the full picture won't be apparent until the month is well along. Weakness is apparent in the **Midwest** where mills are receiving cutbacks. Cold-finished bars are holding up better than hot-rolled bars, but this is only relative. A **Chicago** mill has reduced operations by 25 pct on one of its finishing mills for the entire month of December.

Tool Steels—There are signs of improvement and some **Pittsburgh** producers believe the corner has been turned. One says this month will equal last month. And orders are coming in for the first quarter from big users.

Pipe and Tubing—If interest is translated into orders, there could be a pickup in January. Field offices of **Pittsburgh producers** say users aren't making commitments, but they are inquiring. However, there's no assurance that the interest will become anything more than that. The linepipe outlook is still bleak. Change in administrations is working against any early release of big projects. Foreign pipe is still coming into **East Coast** ports.

Plates and Structurals — There has been no trend toward advance ordering of heavy steels, so there's little indication of future mill activity. Several mills on the **East Coast** report a slight improvement in orders and inquiries, but it isn't enough to carry the overall market upward. As far as **Pittsburgh** mills are concerned, December will fall below the two preceding months. No seasonal lift is expected before March. In the **Midwest,** the mild flurry of plate orders for linepipe have died out. Because some big construction jobs are being rushed through to completion in **Chicago,** structural activity continues to hold up moderately well.

COMPARISON OF PRICES

(Effective Dec. 13, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Dec. 13 1960	Dec. 6 1960	Nov. 15 1960	Dec. 15 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Dec. 13 1960	Dec. 6 1960	Nov. 15 1960	Dec. 15 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.11	$70.11	$70.11	$70.57
Foundry, South Cin'ti	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	69.61	69.61	69.61	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb.‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.32	$66.32	$66.32	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$26.50	$26.50	$26.50	$41.50
No. 1 steel, Phila. area	33.50	33.50	32.50	41.50
No. 1 steel, Chicago	25.50	25.50	25.50	40.50
No. 1 bundles, Detroit	21.50	21.50	21.50	40.50
Low phos., Youngstown	28.50	28.50	28.50	49.00
No. 1 mach'y cast, Pittsburgh	44.50	44.50	45.50	55.50
No. 1 mach'y cast, Phila.	47.50	47.50	47.50	54.50
No. 1 mach'y cast, Chicago	41.50	41.50	41.50	60.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$28.50	$28.50	$28.33	$47.17
No. 2 bundles	18.50	18.50	18.50	27.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	30.00	33.00
Copper, Lake, Conn.	30.00	30.00	30.00	33.00
Tin, Straits, N. Y.	101.875†	102.50	103.625	99.00
Zinc, East St. Louis	13.00	13.00	13.00	12.50
Lead, St. Louis	11.80	11.80	11.80	12.30
Aluminum, ingot	26.00	26.00	26.00	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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*Appears in the Dec. 8-Dec. 22 issues.

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Snow Deadens East Coast

Scrap operations along the East Coast have been brought to a standstill by heavy snow and freezing temperatures.

Elsewhere, the market shows signs of slight firming.

■ Snow and freezing temperatures have brought East Coast scrap activity to a standstill. And the situation is expected to remain this way for several days.

In other parts of the country, the market appears to be firming somewhat. However, scrapmen don't really look for any upswing before the first of the year. And many inland dealers wonder if it will come then.

A firmness in auto and rail lists in Cleveland has resulted in a slight market pickup, but these are the only items moving. There are mild gains on a few grades in the Midwest.

There are also reports that inventories on both the consumer and dealer levels are shrinking in many areas. Though prices remain unchanged, St. Louis dealers are optimistic because of smaller inventories. On the West Coast, new export commitments have picked up the market.

The IRON AGE composite prices for No. 1 heavy melting scrap and No. 2 bundles again remain unchanged at $28.50 and $18.50 respectively.

Pittsburgh—From the standpoint of supply, the market continues to show strength on all fronts. Railroad lists show general price increases and sharp gains for grades affected by export. No. 1 railroad heavy melting brought nearly $37 for export. In the dealer market, yards are resisting a price of $21 for No. 2 bundles. Brokers are showing a little more bullishness. Major local consumers admit it is difficult or impossible to buy at the present prices. However, consumers will not admit they are ready to pay higher prices. This situation has produced a market stalemate. Dealers cannot bring scrap into the district and they are running out of material that can be sold without replacement.

Chicago—The Midwest continues to show mild gains on a few grades. New mill purchases continue light in volume, but pricing is somewhat stronger. Reportedly, brokers are having difficulty filling orders written last week at lower prices, and are fighting a very strong dealer price level. The No. 1 factory bundle price quoted last week was incorrectly listed as $28 to $29. The correct price should have been $29 to $30.

Philadelphia — Heavy snow and freezing temperatures have brought scrap activity to a complete standstill in the area. Prices remain unchanged. Dealers are still hopeful that increased export demand in the first quarter will trigger a general upswing.

New York—The combination of heavy snow and low temperatures which hit the area early this week brought scrap loadings to a complete standstill. Turnings prices are off $1 on appraisal.

Detroit—Things are very slow. Dealers and brokers seem to be marking time and hoping something will happen after the first of the year. Most industrial scrap on the December list went to out-of-state companies.

Cleveland—The tone of the market has picked up slightly because of a firmness in auto and rail lists. But these are still the only items moving. Some tonnages are being laid down for speculation. Special grades have shown a little strength because there's not much around.

Cincinnati—Prices are up $1 for steelmaking grades on broker buying prices to cover old orders. Dealers will let only small amounts go at the current prices.

St. Louis — Some optimism is noticed with both mill and dealer inventories getting smaller. Collections remain slow. However, prices hold unchanged. There is some buying but tonnages are small. Railroad scrap that was offered at current prices has been moved out of the district.

Birmingham—Word that the Japanese will increase orders for the first quarter has firmed the Southeast's export market. Brokers say it also seems to be giving strength to the domestic market.

Buffalo — Prices remain unchanged. Activity continues slow and dealers don't expect any real upswing before the first of the year.

Boston—Bad weather has cut traffic and activity is at a standstill. It appears that it will take several days for the situation to improve.

West Coast—Stepped-up exporting is breathing better life into the market. Dealers expect to be able to fill export orders without difficulty. Major mills in the area are out of the market.

Houston—The domestic market is at a virtual standstill. However, the outlook for the export market has been brightened by new Japanese orders.

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DETROIT 34, MICHIGAN
MANUFACTURING PLANTS—Detroit, Michigan and Torrance, California
SALES-ENGINEERING OFFICES—Detroit, New York, Chicago, San Francisco and Torrance.

MAHON

SCRAP PRICES *(Effective Dec. 13, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	27.00 to 28.00
No. 1 factory bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	26.00 to 27.00
Machine Shop turn.	11.00 to 12.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Low phos. punch'gs plate	32.00 to 33.00
Heavy turnings	23.00 to 24.00
No. 1 RR hvy. melting	31.00 to 32.00
Scrap rails, random lgth	40.00 to 41.00
Rails 2 ft. and under	45.00 to 46.00
RR Specialties	38.00 to 39.00
No. 1 machinery cast.	44.00 to 45.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	85.00 to 90.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	26.00 to 27.00
No. 1 factory bundles	30.00 to 31.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	25.00 to 26.00
Machine shop turn.	10.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. forge crops	36.00 to 37.00
Low phos. punch'gs plate, ¼ in. and heavier	33.00 to 34.00
Low phos. 2 ft. and under	31.00 to 32.00
No. 1 RR hvy. melting	**29.00 to 30.00**
Scrap, rails, random lgth	37.00 to 38.00
Rerolling rails	49.00 to 50.00
Rails 2 ft. and under	42.00 to 43.00
Angles and splice bars	38.00 to 39.00
RR steel car axles	49.00 to 50.00
RR couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	41.00 to 42.00
Cupola cast.	36.00 to 37.00
Cast iron wheel	27.00 to 28.00
Malleable	40.00 to 41.00
Stove plate	31.00 to 32.00
Steel car wheels	35.00 to 36.00
Stainless	
18-8 bundles and solids	165.00 to 170.00
18-8 turnings	85.00 to 90.00
430 bundles and solids	80.00 to 85.00
430 turnings	45.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	12.00 to 13.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Clean cast, chem. borings	23.00 to 24.00
Low phos. 5 ft and under	35.00 to 36.00
Low phos. 2 ft punch'gs	38.00 to 39.00
Elec. furnace bundles	34.00 to 35.00
Heavy turnings	25.00 to 26.00
RR specialties	36.00 to 37.00
Rails, 18 in. and under	47.00 to 49.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	36.00 to 37.00
Cast iron car wheels	37.00 to 38.00
Malleable	45.00 to 46.00
No. 1 machinery cast.	47.00 to 48.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$23.50 to $24.50
No. 2 hvy. melting	20.50 to 21.50
No. 1 dealer bundles	24.50 to 25.50
No. 2 bundles	16.00 to 17.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Low phos. 18 in. and under	31.00 to 32.00
Rails, random length	35.00 to 36.00
Rails, 18 in. and under	43.00 to 44.00
No. 1 cupola cast	34.00 to 35.00
Hvy. breakable cast.	28.00 to 29.00
Drop broken cast	41.00 to 42.00

Youngstown

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	21.00 to 22.00
No. 1 dealer bundles	26.00 to 27.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Low phos. plate	28.00 to 29.00

Cleveland

No. 1 hvy. melting	$23.50 to $24.50
No. 2 hvy. melting	17.00 to 18.00
No. 1 dealer bundles	23.50 to 24.50
No. 1 factory bundles	27.00 to 28.00
No. 2 bundles	16.50 to 17.50
No. 1 busheling	23.50 to 24.50
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Cut structural & plates, 2 ft. & under	31.50 to 32.50
Low phos. punch'gs plate	24.50 to 25.50
Drop forge flashings	23.50 to 24.50
Foundry steel, 2 ft. & under	25.00 to 26.00
No. 1 RR hvy. melting	28.00 to 29.00
Rails 2 ft. and under	44.00 to 45.00
Rails 18 in. and under	45.00 to 46.00
Steel axle turnings	20.00 to 21.00
Railroad cast.	43.00 to 44.00
No. 1 machinery cast.	43.00 to 44.00
Stove plate	36.00 to 37.00
Malleable	43.00 to 44.00
Stainless	
18-8 bundles	165.00 to 170.00
18-8 turnings	60.00 to 70.00
430 bundles	70.00 to 75.00

Buffalo

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 busheling	23.00 to 24.00
No. 1 dealer bundles	23.00 to 24.00
No. 2 bundles	17.00 to 18.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	11.00 to 12.00
Low phos. plate	31.00 to 32.00
Structurals and plate, 2 ft. and under	33.00 to 34.00
Scrap rails, random lgth	32.00 to 33.00
Rails 2 ft. and under	42.00 to 43.00
No. 1 machinery cast.	42.00 to 43.00
No. 1 cupola cast.	36.00 to 37.00

St. Louis

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	25.00 to 26.00
Foundry steel, 2 ft.	27.00 to 28.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	8.00 to 9.00
Cast iron borings	16.00 to 17.00
No. 1 RR hvy. melting	28.00 to 29.00
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	37.00 to 38.00
RR specialties	33.00 to 34.00
Cupola cast	38.00 to 39.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	33.00 to 34.00
Cast iron cars wheels	33.00 to 34.00
Rerolling rails	44.00 to 45.00
Unstripped motor blocks	33.00 to 34.00

Birmingham

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	32.00 to 33.00
Elec. furnace, 3 ft. & under	32.00 to 33.00
Bar crops and plate	37.00 to 38.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR hvy melting	30.00 to 31.00
Scrap rail, random lgth	35.00 to 36.00
Rails, 18 in. and under	44.00 to 45.00
Angles and splice bars	36.00 to 37.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	45.00 to 46.00
Cast iron car wheels	33.00 to 34.00
Unstripped motor blocks	32.00 to 33.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	19.00 to 20.00
No. 2 dealer bundles	14.00 to 15.00
Machine shop turnings	2.00 to 3.00
Mixed bor. and turn.	3.00 to 4.00
Shoveling turnings	5.00 to 6.00
Clean cast. chem. borings	17.00 to 18.00
No. 1 machinery cast.	36.00 to 37.00
Mixed yard cast.	32.00 to 33.00
Heavy breakable cast.	30.00 to 31.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$18.00 to $19.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 dealer bundles	21.00 to 22.00
No. 2 bundles	14.00 to 15.00
No. 1 busheling	18.00 to 19.00
Drop forge flashings	18.00 to 19.00
Machine shop turn.	6.00 to 7.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	9.00 to 10.00
Cast iron borings	9.00 to 10.00
Heavy breakable cast.	23.00 to 24.00
Mixed cupola cast.	29.00 to 30.00
Automotive cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	145.00 to 150.00
18-8 turnings	45.00 to 50.00
430 bundles and solids	50.00 to 55.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$22.00 to $23.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 dealer bundles	22.00 to 23.00
No. 2 bundles	12.00 to 13.00
No. 1 busheling	22.00 to 23.00
Machine shop turn.	3.50 to 4.50
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	11.00 to 12.00
No. 1 machinery cast.	37.00 to 38.00
Mixed cupola cast.	29.00 to 30.00
Heavy breakable cast.	25.50 to 26.50

San Francisco

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	$27.00 to 28.00
No. 2 bundles	18.00
Machine shop turn.	14.00
Cast iron borings	14.00
No. 1 cupola cast.	46.00 to 48.00

Los Angeles

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	24.00 to 25.00
No. 2 bundles	17.00
Machine shop turn.	12.00
Shoveling turnings	**13.00**
Cast iron borings	13.00
Elec. furnace 1 ft. and under (foundry)	42.00
No. 1 cupola cast.	37.00 to 38.00

Seattle

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	31.00
No. 2 bundles	21.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$24.00
No. 2 hvy. melting cut 3 ft. and under	22.50
No. 1 dealer bundles	24.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Bush., new fact, prep'd	23.00
Bush., new fact, unprep'd	18.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	30.00

Houston

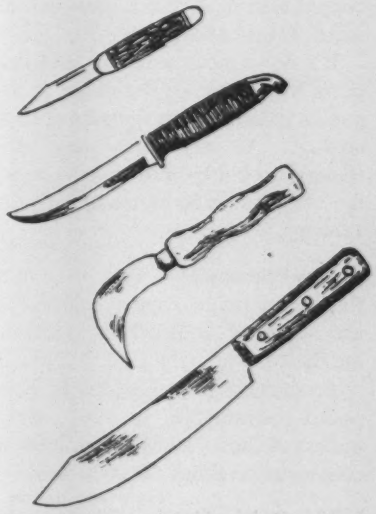
Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 2 bundles	20.50
Machine shop turn.	8.00
Shoveling turnings	11.00
Cut structural plate 2 ft. & under	$40.00 to 41.00
Unstripped motor blocks	26.00 to 27.00
Cupola cast	33.00 to 34.00
Heavy breakable cast.	25.00 to 26.00

Chaucer's Sheffield Whittle

In 14th Century England, Sheffield was already famous for its fine cutlery. Geoffrey Chaucer, diplomat, business man and renowned poet, wrote of the "Sheffield Whittle" as being in common use — more than six hundred years ago.

Today, knives for "whittling," for industry, for agriculture, for the military, are required in millions of units—just one of the nation's numerous demands for steel. To fulfill these demands, a never failing flow of scrap is indispensable.



For the purchase or sale of iron or steel scrap...

phone or write "Your Chicago Broker"

1960 OUR 50th YEAR

M.S. KAPLAN COMPANY

231 S. La Salle St., Chicago

Telephone ANdover 3-3900

Producers May Stockpile Copper

Faced with slow demand for a period of months, copper producers may stockpile rather than close down some facilities.

It's a reflection of the industry's need to stabilize both price and production.

■ With 1961 just weeks away, the primary problem which will face copper men next year is coming into focus: Over-capacity.

It's not a new problem. But reports from some of the major companies indicate there may be a new answer. At any rate, some decisions probably with reservations, are almost sure to be made early in January.

May Stockpile — For the first time some major copper companies are seriously considering stockpiling their metal.

Production has consistently outpaced consumption in 1960. Estimates of how much vary, but a consensus is about 300,000 tons.

No Quick Upturn—Since most copper people agree that no real upturn in business can be expected until well into spring, the question resolves down to this for each copper company—"Cut back output, or stockpile our metal? Or attempt to force copper on the market at someone else's expense?"

Copper has been marked through its long history by sharp lows and highs in its markets. Generally, cutbacks have been restored to, chiefly by operators of marginal mines. But this has been only after they shipped the metal to the four corners of the world seeking a market.

Reluctant to Shut Down—Operators have been, and are, reticent to cut off any one mine completely, even though from an operating standpoint it would be less costly. The cost of putting it back to work when the inevitable upturn comes is too high.

And until now, the cry in the industry has been that it is just plain uneconomical and too expensive to leave money tied up in copper "just sitting in the backyard."

Why the change?

Leveling Off—One reason, copper men are now hoping to level off the traditional peaks and valleys. With cutbacks, supply lines can empty in a hurry when a market firms. And before they can be refilled, the effects of an upturn can be multiplied.

Producers and smelters admit they can do little now to smooth out the peaks and valleys in demand. But they believe if they could smooth out the extremes in price, it would help. Further, some of the top men in the industry are now convinced that stability is vital if copper is to gain much-needed new markets.

Labor a Factor—In 1961 there will be another factor. Contracts with labor unions at the major U. S. copper mines and smelters expire. It's far too early for anyone to hazard a guess on the chances for strikes.

But experienced copper men point out that the basic problems and roadblocks to peaceful agreement between management and labor are about the same as in 1959, when strikes occurred.

The major contracts expire in the summer. But negotiations start late in the spring—just about the time the industry is looking for a pickup in demand.

This could spur a round of hedge buying that would spurt demand over output, at least temporarily.

Magnesium

Shipments of magnesium castings in September were up slightly over the previous month, putting the total for the third quarter slightly below the second quarter.

The pattern prompted Jerry Singleton, executive secretary of the Magnesium Assn. to call the third quarter "the bottom of the current unsatisfactory period."

Total for the third quarter was 2905 tons, down from 2965 tons shipped in the previous quarter. Both figures were markedly short of the 3387 tons shipped in the third quarter last year.

Tin prices for the week: Dec. 7—102.25; Dec. 8—102.125; Dec. 9—101.875; Dec. 12—101.875*; Dec. 13—101.875*.

*Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum ingot	26.00	24.70	12/17/59
Copper (E)	30.80	33.00	10/11/60
Copper (CS)	30.00	31.00	10/13/60
Copper (L)	30.00	33.00	10/13/60
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; **Other primary prices, pg. 143.**

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	55.13	.....	52.36	56.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	51.75	52.04	51.69	55.81
Brass, Red	52.62	52.91	52.56	56.68
Brass, Naval	54.08	60.39	47.89	58.24
Munts Metal	52.14	.....	47.45	.....
Comm. Bz.	54.03	54.32	53.97	57.84
Mang. Bz.	57.82	.....	51.42	.....
Phos. Bz. 5%	75.70	75.70	76.20	77.63

Free Cutting Brass Rod 34.88

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base... $ 1.31
Cobalt, 97-99% (per lb)... $1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb..... 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $208 to $210
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz... $24 to $26
Platinum, dollars per troy oz... $82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 28.25
No. 120 ..... 27.25
No. 123 ..... 26.25
80-10-10 ingot
No. 305 ..... 32.75
No. 315 ..... 30.50
88-10-2 ingot
No. 210 ..... 40.50
No. 215 ..... 37.25
No. 245 ..... 32.50
Yellow ingot
No. 405 ..... 23.50
Manganese bronze
No. 421 ..... 27.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 24.25-24.50
0.60 copper max. 24.00-24.25
Piston alloys (No. 132 type)... 26.00-27.00
No. 12 alum. (No. 2 grade)... 22.75-23.25
108 alloy 23.25-23.75
195 alloy 25.75-26.75
13 alloy (0.60 copper max.)... 24.00-24.25
AXS-679 (1 pct zinc) 23.00-24.00

(Effective Dec. 13, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 23.75-24.75
Grade 2—92-95% 22.50-23.50
Grade 3—90-92% 21.50-22.50
Grade 4—85-90% 21.00-22.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	20⅜	18⅜
Red brass	23¼	22½
Comm. bronze	24	23¼
Mang. bronze	19⅛	18⅜
Free cutting rod ends.	19⅝	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 25¼
No. 2 copper wire 24
Light copper 21¾
*Refining brass 22
Copper bearing material 21
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 24¼
No. 2 copper wire 23½
Light copper 21
No. 1 composition 20¾
No. 1 cop. turnings 20¼
Hvy. yellow brass solids 15½
Brass pipe 14½
Radiators 16½

Aluminum

Mixed old cast. ..... 12½—13
Mixed new clips ..... 14½—15
Mixed turnings, dry ..... 13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 22 —22½
No. 2 copper wire ..... 20½—21
Light copper ..... 18½—19
Auto radiators (unsweated).. 12½—13
No. 1 composition ..... 17½—18
No. 1 composition turnings... 16 —17
Cocks and faucets ..... 13 —13½
Clean heavy yellow brass ... 12¼—12½
Brass pipe ..... 13½—14
New soft brass clippings..... 13½—14
No. 1 brass rod turnings .... 12½—13

Aluminum

Alum. pistons and struts .... 6½— 7
Aluminum crankcase ..... 8½— 9
1100 (Ss) aluminum clippings 11½—12
Old sheet and utensils ..... 8½— 9
Borings and turnings ..... 4½— 5
Industrial castings ..... 9 — 9½
2020 (24s) clippings ..... 10 —10½

Zinc

New zinc clippings ..... 7 — 7¼
Old zinc ..... 4 — 4½
Zinc routings ..... 3 — 3¼
Old die cast scrap ..... 2 — 2¼

Nickel and Monel

Pure nickel clippings 52-54
Clean nickel turnings 40
Nickel anodes 52-54
Nickel rod ends 52-54
New Monel clippings 23-23.50
Clean Monel turnings 16.50-17
Old sheet Monel 22-23
Nickel silver clippings, mixed. 18
Nickel silver turnings, mixed. 15

Lead

Soft scrap lead ..... 7¾— 8
Battery plates (dry) ..... 3 — 3¼
Batteries, acid free ..... 2 — 2¼

Miscellaneous

Block tin ..... 75 —77
No. 1 pewter ..... 57.50—58
Auto babbitt ..... 43 —44
Mixed common babbitt ..... 10¼—10¾
Solder joints ..... 14½—15
Siphon tops 41
Small foundry type ..... 9¾—10¼
Monotype ..... 9¾—10¼
Lino. and stereotype ..... 8¾— 9
Electrotype ..... 7½— 7¾
Hand picked type shells ..... 5¼— 5¾
Lino. and stereo. dross ..... 2¼— 2¾
Electro dross ..... 2¼— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh Midland Butler Aliquippa N. Castle McKeesport Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3, B4, M10* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, City, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

• Electro-galvanized-plus galvanizing extras.

(Effective Dec. 13, 1960)

STEEL PRICES

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		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for .50 lb. base box for .45 lb. deduct 15¢; for .55 lb. add 15¢; for .60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	$6.35 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	$6.25 *U1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1**		6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	$6.35 *T2*
	Houston, Texas									6.65 *S2*			

Holloware Enameling
29 ga.—*7.85 U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; *7.95 G2* at Granite City.

* Electrogalvanized sheets.

(Effective Dec. 13, 1960)

†† 7.425 at Sharon; Niles is 7.225.

STEEL PRICES

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		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*		7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.		5.675 *B3*									
	Fairless, Pa.	5.825 *U1*	5.825 *U1*									
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Manafield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1, A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Dec. 13, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B.. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co..
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore**	$.10	7.87	9.71	10.16	10.78	8.44	9.13	8.65	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	16.76	.....	.....
Boston**	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.80	9.95	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.72	10.35	10.30	10.89	8.56	9.06	8.70	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	8.89	10.41	10.35	11.21	8.94	9.62	9.02	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.72[1]	10.03	11.39	11.01	8.80	9.45	8.81	11.40	17.21	16.21	21.31	20.56
Denver**		10.90	12.53	13.27	13.07	10.74	11.24	10.88	12.97	.....	.....	.....	20.84
Detroit**	.15	8.98	10.61	10.65	11.26	8.93	9.62	9.01	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	9.65	12.19[3]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.50	11.42	10.95	11.76	9.43	9.93	9.57	11.77	17.17	15.87	21.87	21.12
Los Angeles**		9.59[1]	11.29	12.20	11.29	9.70	10.45	9.55	14.20	18.30	17.35	22.90	22.20
Memphis**	.15	9.13	10.20	.....	11.39	8.81	9.16	8.97	12.89	.....	.....	.....	.....
Milwaukee**	.15	8.86	10.49	10.44	11.03	8.70	9.28	8.84	11.04	17.24	16.24	21.24	20.59
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia**	.10	8.45	9.70	11.50	10.95	8.80	9.05	8.85	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	8.72	10.03	11.28	10.99	8.56	9.06	8.70	11.40	17.10	16.10	21.20	20.45
Portland**		9.45	11.30	12.35	11.45	9.60	10.80	9.45	16.65	18.60	17.80	22.70	22.20
San Francisco**	.10	10.27	11.79[2]	11.50	11.88	10.48	10.50	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.92	10.75	10.68	11.09	8.77	9.29	8.92	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	8.99	9.84	10.99	11.16	8.83	9.33	8.97	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅞-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅛" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13c zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Dec. 13, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)	
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46
Machine Screws—bulk		
¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Dec. 13, 1960)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50–32.75	32.00	29.50–34.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A5;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A5;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Annld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****.	173	190	...	...	190	9.00	9.675
Atlanta *A8***....	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*.....	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*.....	173	191	177	212	197	9.00	9.75
Chicago *R3*.....	.....	.....	.....	.....	.....	9.00	9.55
Chicago *W7*.....	173	.....	.....	.....	.....	9.00	9.55†
Cleveland *A6*....	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*....	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*..	173	187	...	212	193	9.00	9.55
Duluth *A5*.....	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*...	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*.....	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*...	173	187	...	212	193	9.00	9.55
Kokomo *C9**.....	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2*****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*....	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*..	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*..	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*.	.....	.....	.....	236	.....	9.95	10.50
SparrowsPt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*...	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*.	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*6.25	.....	*2.25	.....	0.75	.....	1.25	.....	1.75	.....	2.25	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

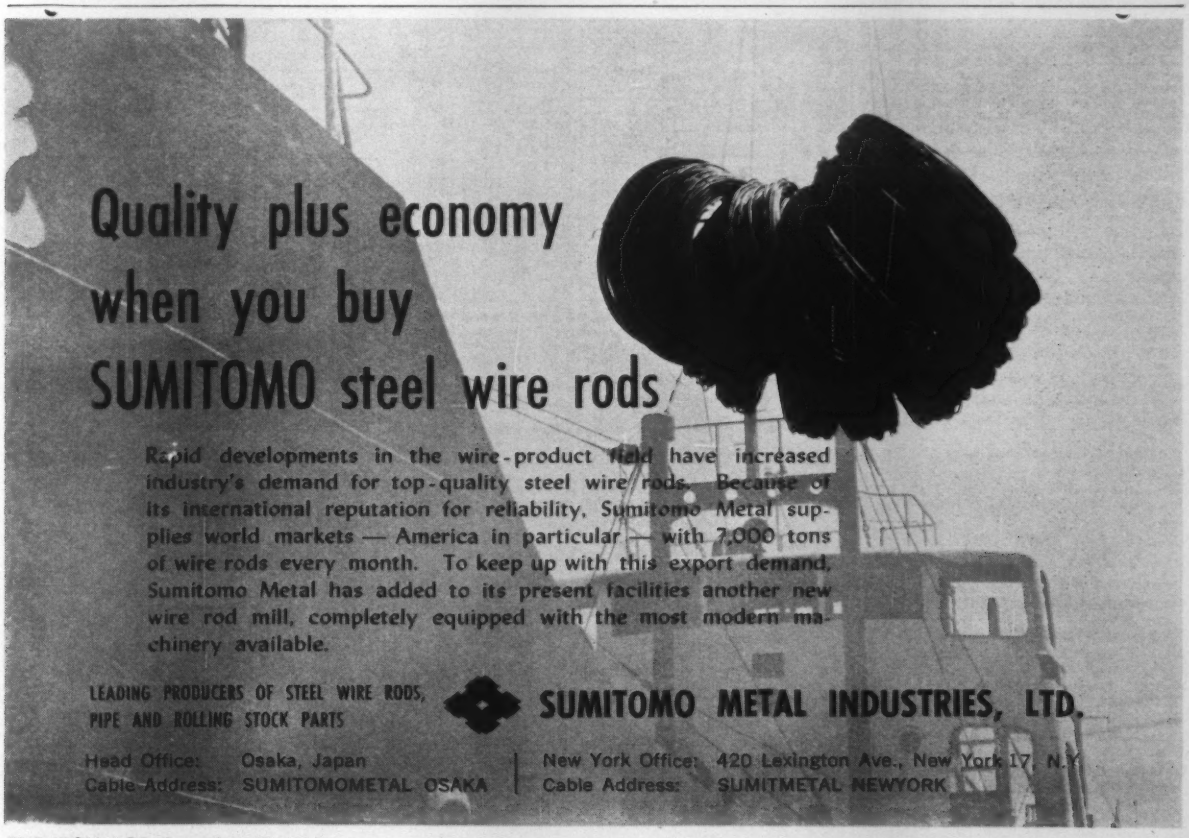
CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75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SUMITOMO steel wire rods
Rapid developments in the wire-product field have increased industry's demand for top-quality steel wire rods. Because of its international reputation for reliability, Sumitomo Metal supplies world markets — America in particular — with 7,000 tons of wire rods every month. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.
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Head Office: Osaka, Japan
Cable Address: SUMITOMOMETAL OSAKA
New York Office: 420 Lexington Ave., New York 17, N.Y.
Cable Address: SUMITMETAL NEWYORK

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1**	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Rolled elliptical, 18 in. or longer, 5000 lb lots 43.50
Electrodeposited, 5000 lb lots ... 36.50
Brass, 80-20, ball anodes, 2000 lb or more 50.50
Zinc, ball anodes, 2000 lb lots 20.25
(for elliptical add 1¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb 1.0225
(Rolled depolarized add 3¢ per lb)
Cadmium, 5000 lb 1.50
Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.. 65.90
Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit 17.45
Nickel sulfate, 5000 to 23,000 lbs... 29.00
Nickel chloride, freight allowed, 100 lb 45.00
Sodium cyanide, domestic, f.o.b. Chicago, 200 lb drums 25.00
Zinc cyanide, 100 lb, N. Y. 60.75
Potassium cyanide, 100 lb drum N. Y. 45.50
Chromic acid, flake type, 10,000 lb or more, N. Y. 30.94

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50
Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots 25.75
Carbonyl Iron (200 lb lots) 88.00
Welding Grades 8.10
Cutting and Scarfing Grades 9.85
Hydrogen reduced, domestic 11.25

Copper Powders

Molding Grades
Electrolytic, domestic, f.o.b. shipping point. 15.00†
Atomized ..... 43.3 to 61.3
Reduced ..... 15.00†
Chemically Precipitated 44.5
Brass, 5000-lb lots ..... 35.2 to 50.1
Bronze, 5000-lb lots ..... 51.3 to 55.2
Chromium, electrolytic 5.00
Lead ..... 7.50†
Manganese, electrolytic ... $1.00
Molybdenum .....$3.60 to $4.35
Nickel $1.15
Carbonyl Nickel, 20,000 lb lots $1.01
Nickel-Silver, 5000 lb lots.. 58.8 to 66.9
Silicon 70.00
Solder ..... 7.00†
Stainless Steel, 316 ..... $1.07
Stainless steel 304 ..... 89.00
Tin ..... 14.00†
Titanium, 99.25 + pct, per lb, f.o.b. $11.25
Tungsten, carbide grades... $3.25
Zinc ..... 21.0 to 34.2

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*)· Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, P2, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 43.40; 1 side, 36.35.

(Effective Dec. 13, 1960)

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.... $185.00
High duty (except Salina, Pa., add $5.00) 140.00
Medium duty 125.00
Low duty (except Salina, Pa., add $2.00) 103.00
Ground fire clay, net ton, bulk... 22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00
Childs, Hays 163.00
Chicago District 168.00
Western Utah 183.00
California 185.00
Super Duty
Hays, Pa., Athens, Tex., Windham, Warren, O. 163.00-168.00
Silica cement, net ton, bulk, Chicago 26.75
Silica cement, net ton, bulk, Ensley, Ala. 27.75
Silica cement, net ton, bulk, Mt. Union, Pa. 25.75
Silica cement, net ton, bulk, Utah and Calif. 39.00

Chrome Brick

Standard chemically bonded, Baltimore, Md. $620.00
Gary, Ind. 658.50
Standard, Pascagoula, Miss. 647.50
Standard chemically bonded, Curtiner, Calif. 119.00
Burned, Baltimore 585.00

Magnesite Brick

Standard, Baltimore $715.00
Chemically bonded, Baltimore 655.00
Chemically bonded, Pascagoula, Miss. 682.50

Grain Magnesite

St. ⅜ to ½-in. grains

Per net ton

Domestic, f.o.b. Baltimore in bulk. $73.00
Domestic, f.o.b., Pascagoula, Miss... 80.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 46.00
in sacks 52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.75
Missouri Valley 15.60
Midwest 17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
Jones & Laughlin *	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

* Electricweld only.

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Light and heavy machinery for all classes of sheet metal plate and structural work . . .

Capacity to 6 inch plate cold

THE LARGEST EVER BUILT

ORGANIZED 1879, INCORPORATED 1911

BERTSCH & COMPANY

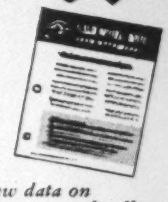
CAMBRIDGE CITY INDIANA

Thermocouple Alloy

TRADE NAMES

vs.

ISA* STANDARDS



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Specify Type K thermocouple wire per ISA Standards . . . and ask your supplier about his experience with the new Thermo-Kanthal alloys.

Their increased stable life means more accurate readings for longer periods . . . with no change in instrumentation required.

If your supplier's tests are not completed, write for Thermo-Kanthal Alloy Bulletin and lower prices.

May we quote on your bare and insulated wire requirements?

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* Instrument Society of America

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NON-FLUID OIL

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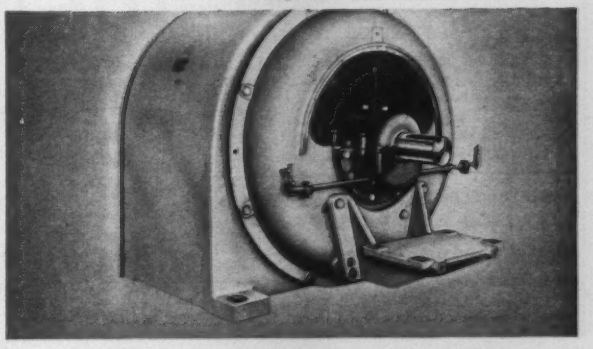
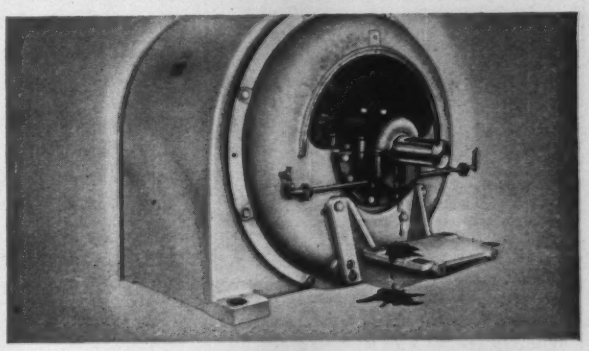


NON-FLUID OIL Stays in



Ordinary Oils Drip Out

NON-FLUID OIL is best for motor lubrication because it remains in motor bearings until entirely consumed. Ordinary oils leak at the ends of bearings causing messy hazardous floor and surroundings.

Unlike ordinary oils, NON-FLUID OIL does not creep or throw onto armatures and cause burnt out windings from oil-soaked insulation. It is the superior lubricant for cool, long-lasting motors that cost less to maintain.

For motors of ball and roller bearing types, heavier grades of NON-FLUID OIL offer additional advantages, depending upon the method of application and temperature conditions encountered.

Write today for a free testing sample and Bulletin No. 504 and see for yourself how NON-FLUID OIL can improve the operation of your motors.

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DRILL, HORIZONTAL, W.F. & John Barnes Model 420, late
DRILLS, MULTIPLE, Model 4BL Natco, 36 spindle
DRILL, RADIAL, 6' 19" column Cincinnati Bickford super service
DRILL, SENSITIVE, 24" No. 3 Allen, 3 spindle on 5 spindle base
DRILL, SENSITIVE, 26" Model 2LMS Leland Gifford 2 spindle
DRILL, SENSITIVE, 24" No. 3B12 Edlund 2 spindle
DRILL, UPRIGHT, 24" Cincinnati Bickford PF
DRILL, DRIVER, No. 15½ Foote Burt vertical hydraulic (3)
GEAR MACHINERY, No. 7A Model 7125A Fellows, H.S., Universal gear shaper
GEAR HOBBER, No. 12H hy. G & E Universal
GEAR GENERATOR, No. 5B Farrel Sykes (3)
GEAR SHAVER, Model GCC, 8" Red Ring, late
GRINDER, CENTERLESS, No. 12 Landis, Microsphere bearings
GRINDER, CYLINDRICAL, 22" x 72" Landis Type C hydraulic, plain
GRINDER, CYLINDRICAL, 12" x 48" Cincinnati universal, Filmatic, late
GRINDER, INTERNAL, No. 271 Heald plain, hydraulic, new '51
GRINDER, INTERNAL, No. 24-36 Bryant hole grinder, late (3)
GRINDER, SURFACE, No. 72 Hanchett rotary, 3 head, new '46
HONE, No. 224 Barnes vertical internal hydraulic, '43
KEYSEATER, No. 4 Mitts & Merrill, new '50
KEYSEATER, 24" x 24" x 6' Ingersoll keyway mill
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LATHE, PRODUCTION, 20" x 90" LeBlond, geared head
LATHE, TURRET, No. 2 Warner & Swasey, ram type, new bar feed
LATHE, TURRET, No. 4L Gisholt heavy duty, saddle type, cross feeding turret
LATHE, 60" Model T Lodge & Shipley right angle chucking
MILL, PRODUCTION, No. 33 Sundstrand, Fluidsrew, Rigidmil

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1961 Looks Good For West Coast

Used machinery dealers on the West Coast say 1961 sales should be up.

Greater population growth, more aerospace work, and increased electronic activity should mean better business.

■ Continued expansion of population, a stepup in aerospace work, and increased electronic activity should add up to better used machinery business on the West Coast next year.

At least that's what many used machinery dealers told The IRON AGE.

With the population explosion, comes the need for a wider variety of consumer goods. West Coast appliance producers, for example, will be scouting the used machinery market.

More Defense Work — Though 1960 was a slow year in the aerospace industry, the Kennedy Administration has promised to beef up defense work. A large portion of the defense dollar ends up in aerospace work.

And, the Farwest pace of one new electronics company a day seems likely to continue.

Electronics equipment makers are the mainstay for the area's No. 1 seller—sheet metal equipment—which has held the top sales spot for several years. Dealers are confident they can keep up with the demand for shears, presses and brakes.

Renewed Demand—The toughest supply problem next year will be in circular equipment, dealers report. They see renewed demand for engine lathes, turret lathes, and grinding equipment. They'll need short bed lathes with a big swing—48 in. to 90 in. Vertical boring mills may also get a lot of attention.

Most dealers note that prices will probably remain about the same. But if demand forces dealers to import equipment from the East, prices will go up.

Activity among used machine dealers in northern California is particularly good, but dealers say the situation is better than during the slow summer months.

Plenty of Inquiries—One dealer, who started strong in the first quarter and slowed considerably during the second and third, now has one man working full time answering inquiries. He says that, even if only a small number of inquiries result in sales, business will have to get better.

ELECTRICAL EQUIPMENT
RE-NU-BILT-GUARANTEED

M-G SETS 3PH-60 CY.

Qu.	KW	Make	RPM	DC Volts	AC Volts
2	4800(3U)	GE	450	300	2300/4600
1	2400	GE	450	300	2300/4600
1	2000	GE	514	600	2300/4600
2	1750/2100	GE	514	250/300	2300/4600
1	1750	GE	514	600	2300/4600
1	1500	GE	720	600	6600/13200
1	1000	GE	720	275	2300/4160
1	1000	GE	900	260	4000/6600
1	1000	GE	900	600	2300/4160
1	500	GE	900	125/250	440
1	500(New)	GE	1200	300	2300
1	500	GE	900	250	2300/4160
1	350	GE	900	125	440/2300/4160
1	300	GE	1200	275	2300/4160
1	300	GE	1200	250	440/2300
1	250	GE	900	250	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse	1200	550	2300
1	200	El.Mhy.	1200	250	2300/4600
1	150	GE	1200	275	2300
1	150	Whse.	1200	275	2300

D. C. MOTORS

Qu.	HP	Make	Type	Volts	RPM
1	3900(New)	GE	Enc. S.V.	475	320
1	3000(New)	Whse.	Enc. F.V.	525	600
2	2700	GE	Enc. S.V.	415	280
1	2250(New)	GE	Enc. S.V.	600	200/300
1	2200	GE	MCF	600	400/500
2	2000	GE	Enc. S.V.	350	230/350
2	1750	GE	Enc. S.V.	250	175/350
2	1500	Whse.	New	600	300/700
4	1500	Whse.	New	525	600
1	1300	GE	MCF	300	200/400
1	1200	GE	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D-8	600	600/900
2	900	GE	MCF	250	180/360
1	850	GE	MCF	250	85/170
1	750	GE	MCF	600	120/360
2	750	GE	MCF	600	450/900
2	645	SS		300	1000
4	600	Whse.		250	275/550
5	400	GM	D-8	250	300/900

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2000# SWINDELL—1000 KVA
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20 KW THERMONIC Induction Heater 2 station
20 KW ECCO Induction Heater
15 KW GIRDLER Dielectric Heater

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48x72 WHEELABRATOR w/loader
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3 Phase—60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
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1**	1800	Whse.	Mill	2300	252
1**	1300	Whse.	CW	2200	444
1	700	Whse.	CW-1224	2200	600
1**	500	Al.Ch.	ANY	2200	505
1**	500	Al.Ch.	ANY	2200	293
1	460	Whse.	CW	2200	600
1*	400	Al.Ch.	ANY	2200	505
1	400	Whse.	CW	2200	290
1	350	G.E.	IE15-M	2200	1180
3	300	G.E.	IE15B-M	440	1200
1	300	Whse.	CW-1012	2200/440	720
1	250	Whse.	CW	4160/2400	710
1	250	Whse.	CW	2200	600
1	250	Cr.Wh.	Size Q	4600/2300	350
1	250	G.E.	MT-414	2200	300
2	200	G.E.	I-17-M	2200/440	600
1	200	G.E.	I-14-M	2200	490
1	150	G.E.	MT-564	2200/440	700
1	150	Whse.	CW	4160/2200	585

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**—Mill type with stator shifting base

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4' -11" col. American Hole Wizard, m.d.
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6' -17" col. American Triple Purpose, m.d.
6' -17" col. American Hole Wizard, m.d.
6' -19" col. Carlton, m.d.—1943
7' -16" col. American Triple Purpose, m.d.
8' -19" Fosdick, m.d.
Baush Radial Drilling & Tapping Machine, m.d.

BALL BEARING DRILLS
No. ½ Avey MA8, m.d.
No. 2 LMS Leland & Gifford, m.d. H.S.
No. 2 LMS Leland & Gifford, single spindle, m.d. H.S.
No. 4 BM Fosdick, single spindle H.S., m.d.
No. 4 MS Leland & Gifford, H.S., 4 speed A.C. m.d. two spindle
1 spindle No. 2MA6 H.S. Type B, m.d., Avey, 7½" overhang, 1943
2 spindle Allen, Belted m.d., 8" overhang
2 spindle No. 2 Avey H.S., Belted m.d.
2 spindle No. 2 BMA 1 Avey Production Type, m.d.
2 spindle No. 2 MS Allen, H.S., m.d.
2 spindle No. 2 Leland & Gifford H.S., 8" overhang, m.d.
2 spindle No. 2 Footburt Sipp Sensitive H.S., m.d.
2 spindle Leland & Gifford H.S. Hydraulic Type, m.d.
2 spindle No. 2 LMS Leland & Gifford, hydraulic step by step H.S., m.d.
3 spindle No. 2B—8" Edlund, m.d., H. S.
3 spindle No. 2 MA 6 Avey, H.S. m.d.
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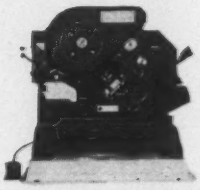

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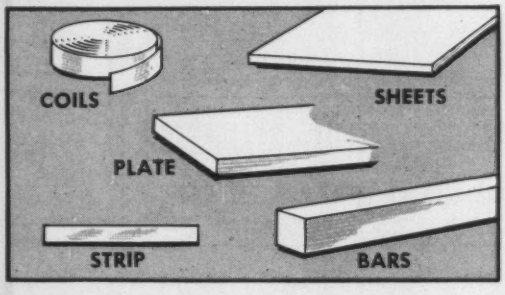

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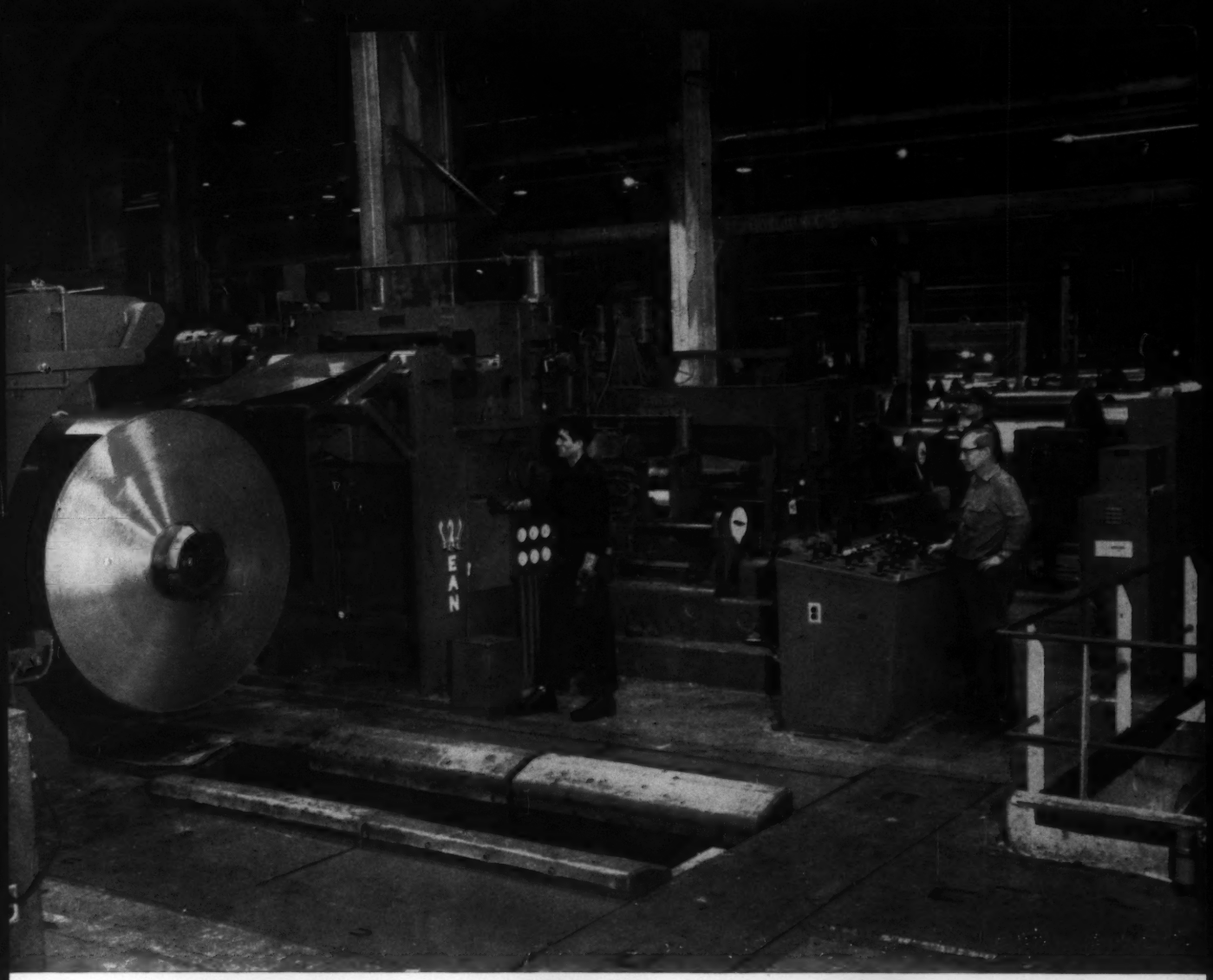

Weirton Steel installs Wean Trimming Line for more efficient tinplate operation

Weirton Steel Company Division of National Steel Corporation recently installed this new Wean side trimming line to increase efficiency in its tinning operations. After the plate has been tempered to customer specifications, it is moved to the Wean tension-type line for final trimming. This advance preparation of coils provides larger, evenly wound coils for the electrolytic tinning line.

The Wean side trimming line has a maximum speed of 4,000 feet per minute and is able to handle 60,000 pound coils 18 to 45 inches wide. Inside diameter of the coils is 16½ inches; maximum outside diameter is 85 inches. Many new design features are incorporated to side-trim coil to accurate widths at high speed.

To improve the efficiency of your tinplate production, call upon a Wean representative to help you plan your requirements. Wean's "creative engineering" has played a vital role in the development of over 75% of the continuous tinplate processing lines in operation today.

WEAN

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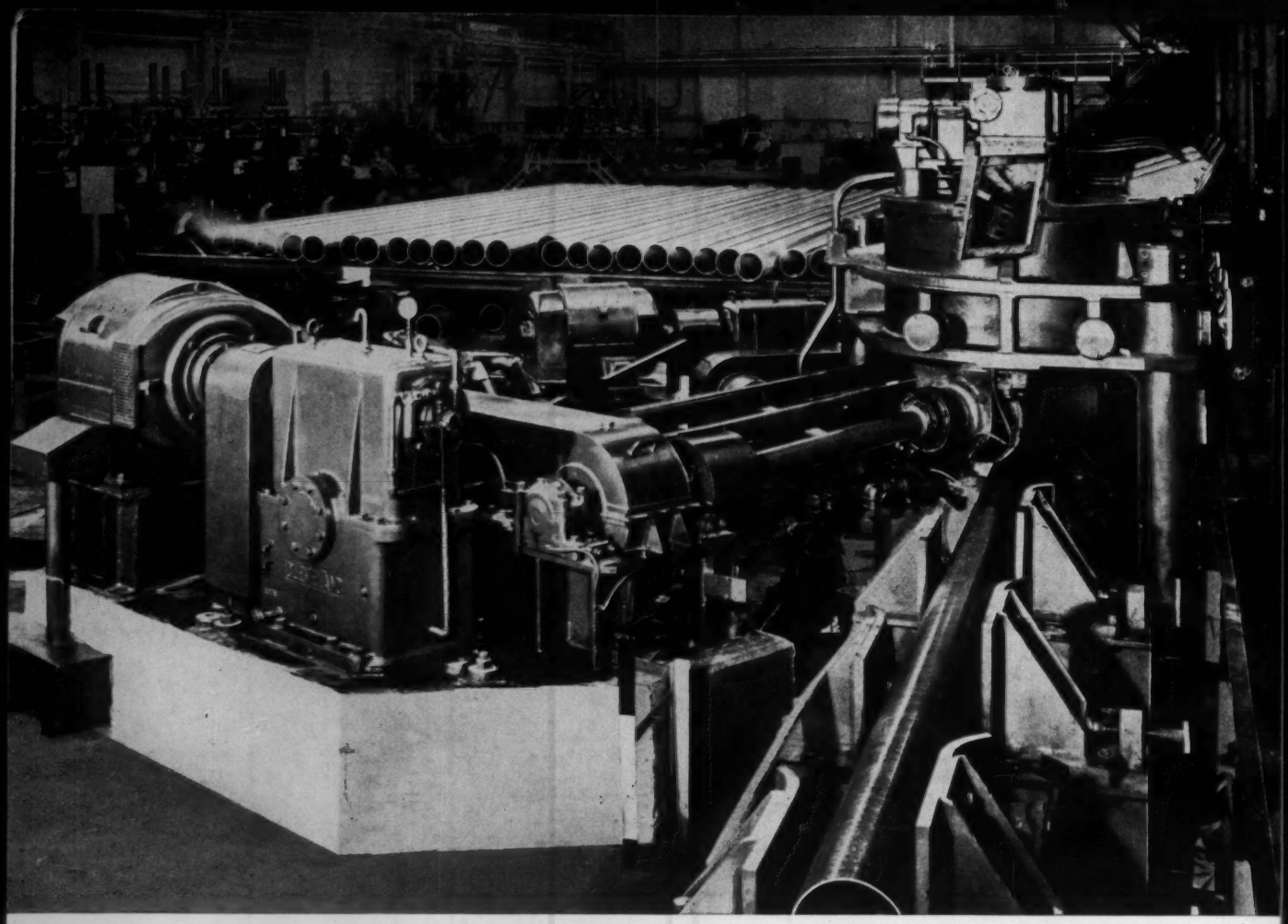

How to straighten the really big pipe!

One major Eastern steel producer has found the answer – the big Mack-Hemp Model A-5 Straightener shown above – the largest of its type in the world!

This A-5 takes really big bowed pipe from the sizing mill, pulls it in through three pairs of opposed cross rolls and then spins it out straight and round to high tolerances in only a single pass.

This despite the fact that the steel pipe being straightened is 16-inch in diameter, fifty feet in length!

To do a job like this, of course, the massive 85-ton roll frame is a must, as are the heavy duty rolls, and the combined 200 HP motors used to drive all six of them. In its first year, this Mack-Hemp A-5 straightener has handled more than 200,000 tons of pipe.

If straightening pipe or tubing is your problem – any size, any alloy – consider doing it yourself. The men from Mack-Hemp will be glad to give you all the facts you'll want to know.

MACKINTOSH-HEMPHILL
Division of E. W. BLISS Company
Pittsburgh and Midland, Pa.

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